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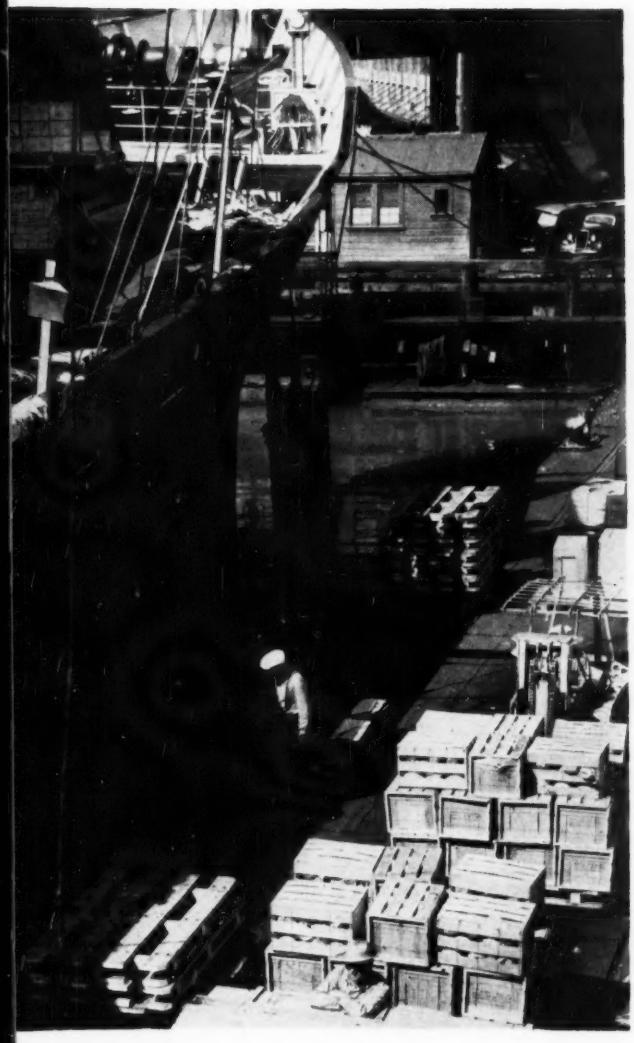
# Chemical Week



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September 12, 1959

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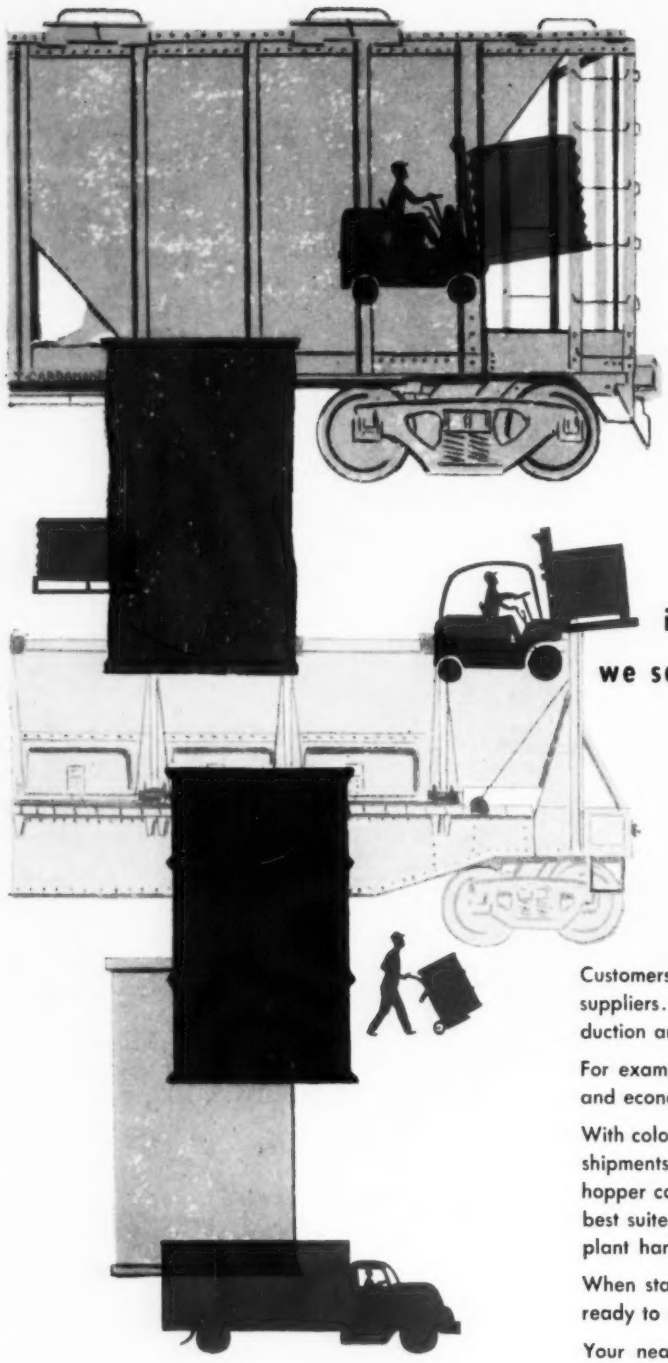

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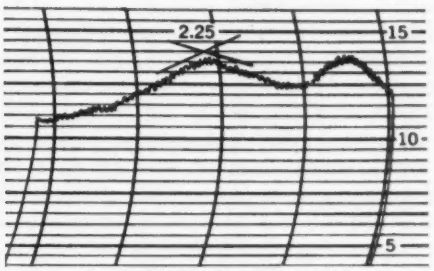


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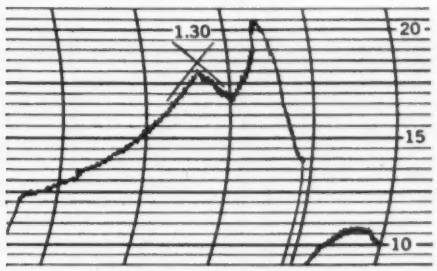


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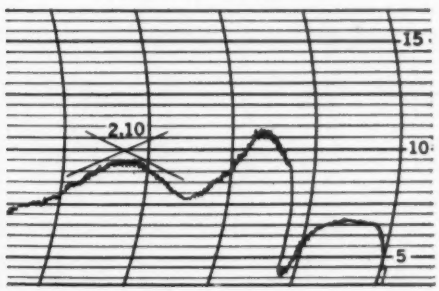


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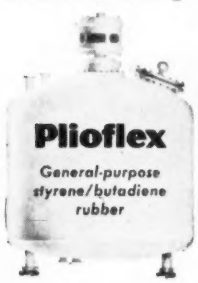


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Chemical Week

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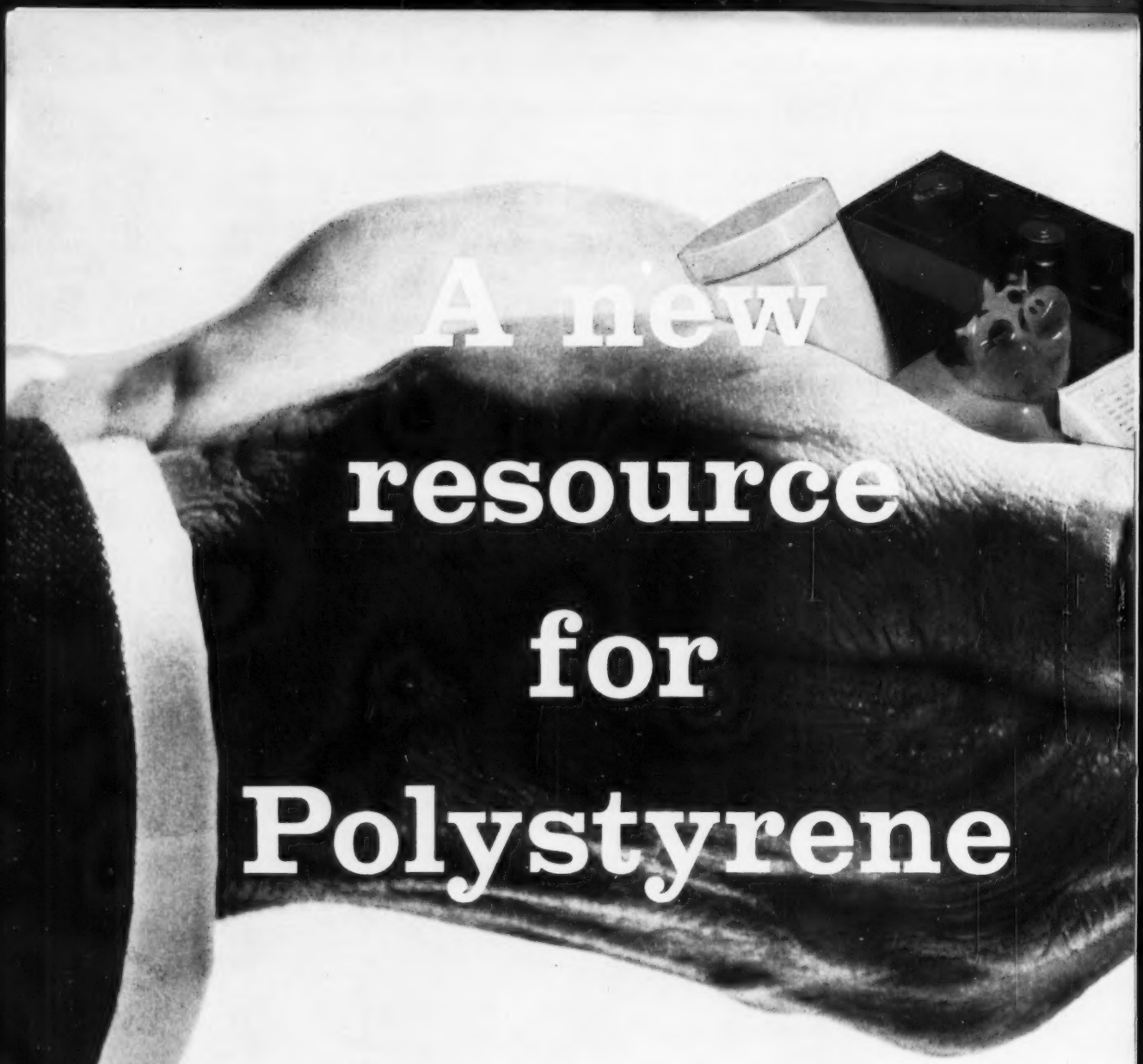
**43,629 copies of this issue printed**

Vol. 85
No. 11

Chemical Week is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Place of publication: 3rd and Hunting Park Ave., Philadelphia 40, Pa. Second-class postage paid at Philadelphia. Subscription: $3/year in U.S.A. Send subscription correspondence and change of address to Fulfillment Manager, Chemical Week. Please see page 7 for subscription requirements.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N. Y.



# A new resource for Polystyrene

High impact and conventional Polystyrene plastic molding compounds will be manufactured by Amoco Chemicals at Joliet, Illinois. Large-scale commercial manufacturing facilities will go on stream in late 1961. Quantities for customer evaluation will be available from a product development plant also underway and scheduled to be completed by mid-1960.

In addition to these manufacturing facilities, Amoco is establishing a comprehensive technical service program to assist customers in the use of AMOCO Polystyrene. Research which has preceded the launching of this Polystyrene program will be expanded so that Amoco may continue to make important contributions in the field of polymer chemistry.

These production, technical service, research and other facilities are a multi-million dollar extension of Amoco Chemicals' plan for becoming a new resource to industry. If you mold or use Polystyrene, watch for further information about the progress of this Amoco Chemicals project.

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**SEPTEMBER 12, 1959** **Vol. 85, No. 11**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE EDITORIAL CIRCULATION and ADVERTISING OFFICES: McGRAW-HILL BUILDING, 330 West 42nd St., New York 36, N.Y. See panel below for directions regarding subscriptions or change of address. Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice-President; L. Keith Goodrich, Vice-President and Treasurer. John J. Cooke, Secretary; Nelson Bond, President, Publications Division; Harry L. Waddell, Senior Vice-President; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; A. R. Venezian, Vice-President and Circulation Coordinator.

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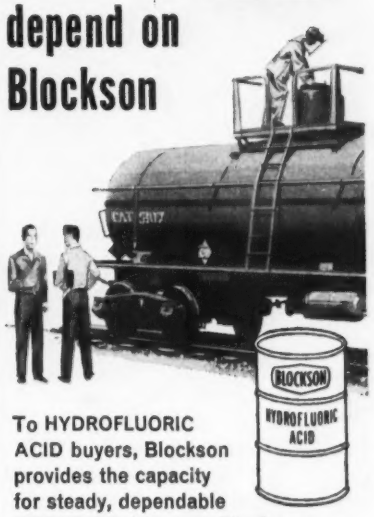


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*The CMC Story*

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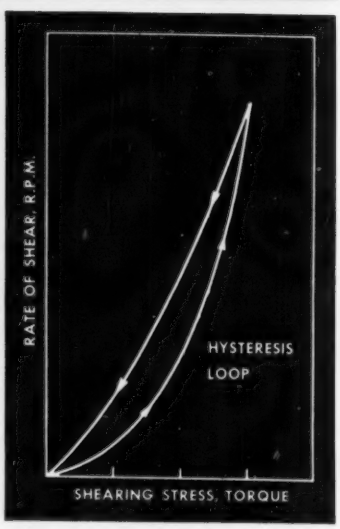


**FROM ONE EXTREME...**
This unretouched photo shows a thixotropic solution of CMC being poured. Rheogram traces characteristics of a thixotropic CMC-7H solution.

## *Hercules Has the*

Starting with a laboratory curiosity —crude and nonuniform—a Hercules research and production team years ago developed the first commercial purified CMC — cellulose gum. Uniform and stable in price, cellulose gum immediately proved far superior to natural gums in a wide range of uses, and as a result has been in ever-increasing demand.

**THIXOTROPIC**—The first CMC to be made was a thixotropic material. A picture and graph of its solution characteristics are shown on the left. This property is important in many applications; for example, because it thickens on standing, it's ideal for suspending solids in calamine lotion, or pigments in water-based paints.

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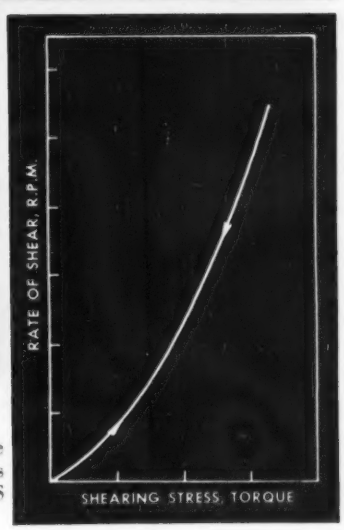



**...TO THE OTHER**
Nonthixotropic CMC solution pours like water. Rheogram illustrates characteristics of a nonthixotropic pseudoplastic CMC-7HS solution.

# VIEWPOINT

*Political action by business is in the news. But is the movement going too fast and too far? Some comments on this made by a civic leader and former mayor of Cincinnati, Charles P. Taft, in the Aug. 30* New York Times Magazine, *deserve serious attention—whether or not one agrees with every point he makes. Herewith, by permission, some excerpts:*

THERE IS A LOT of sound thinking behind a political program for a "better business climate." But there is something wrong with the broad drive to get employees into politics. As Democratic National Chairman Paul Butler, in a joint interview with Thruston B. Morton, his Republican counterpart, said: "With narrow purposes in mind, businessmen are going to end up alienating the general public, creating suspicion of the business community and doing a clumsy job of obtaining even their narrow objectives." And as Mr. Morton warned: "If businessmen are to achieve a maximum effectiveness in politics, they must work toward this goal as citizens rather than as spokesmen for, or representatives of, just one segment of our total economy."

Henry Kaiser and George Romney, both pretty good judges of sound business public relations, have stood against the whole idea of business telling its employees to go into politics—apparently for just the reasons Butler and Morton gave.

That warning is sound. What is really self-interest, however justifiable, ought not to be blown up into civic spirit.

A second thing wrong with the campaign is that it is, in fact, aimed at labor. This central motivation—to rival big labor and beat down labor organizations—is openly stated in many cases. And in fact I cannot remember any endorsement of political participation by business not closely related to emotion about the labor problem.

But labor is not as effective in politics as many businessmen assume. Labor can vote against, when the issue is something like the "right to work," and when people in general feel the issue is simply punitive, not constructive. But although workers may get herded out to register, they do not vote as "labor." In fact, they do not vote much at all.

The other reason against just "opposing labor" is that a wholly negative campaign, for all that it may be temporarily effective, does not work in the long pull. As Arthur Motley, the publisher of Parade magazine has put it: "I can see no future for business and our kind of economy if we're merely going to have 'big business' opposing 'big labor' in the political arena."

This leads us to my third general objection to the "business into politics" campaign—the fact that it looks, and sometimes acts, as if it were against all progress.

My final objection to the movement is that it generally neglects local government. Rather, the sponsors back the local "organization" for supposedly doing the job for the candidates for president, senator, congressman or governor.

Businessmen who go into politics should learn first that the "pros" have no interest in their participation except as moneybags or fat cats, and perhaps as rubber stamps for the ticket.

Yet there is much that businessmen could do in politics. They are urgently needed. Let me lay out some guidelines:

(1) One thing that businessmen are doing, and that they should do more of, is exemplified by the Cleveland Foundation, the Citizens Development Committee in Cincinnati and the Allegheny County group in Pittsburgh. These organizations back master redevelopment plans for their areas, and help encourage local officials of either party to carry these plans through.

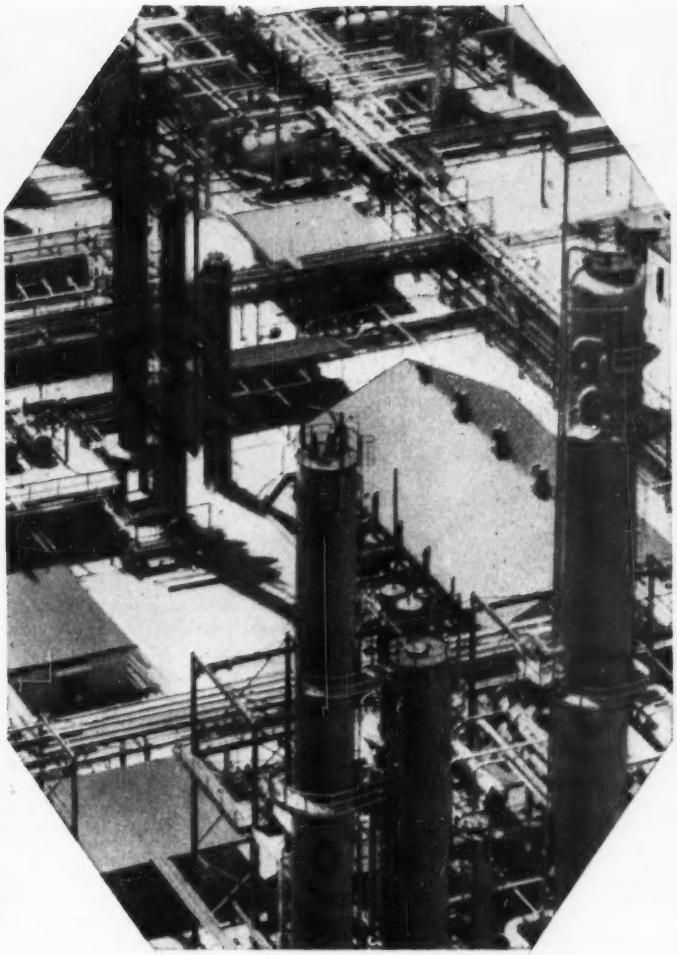
(2) Businessmen should take adult courses in economics. Too many of the vocal spokesmen for business rely on self-constituted research organizations that tell them what they want to hear instead of on professionally recognized groups like the National Bureau for Economic Research, the Brookings Institution or the National Industrial Conference Board.

(3) Businessmen ought to write their own speeches and do a lot of their own homework. They should practice persuasive speaking, seek critical comments on their technical proficiency. Few businessmen can stand up to comparable labor leaders, mostly for want of practice and training in both sound economics and public speaking.

(4) Businessmen should realize that the place to begin is usually with a fight—against the organization—to get good candidates nominated and elected in both the party primary and the election. Talking about starting in the precincts of your own party organization is eyewash, because intelligent young businessmen are the last thing the local machine wants. It wants order-takers who will produce votes for the slate at the primary. After that, of course, the voters probably have little choice.

But despite this, let me say that every good American ought to be in politics, because through politics his government is run in a way that provides justice for his rights.

Businessmen can help make the word "politician" an honorable tag, even an intellectual tag, and have all kinds of fascinating fun doing it. But no one should fall for the canned slogan: "Join the party of your choice and start working in it at the precinct level (and boy, let's sock these damned unions)."



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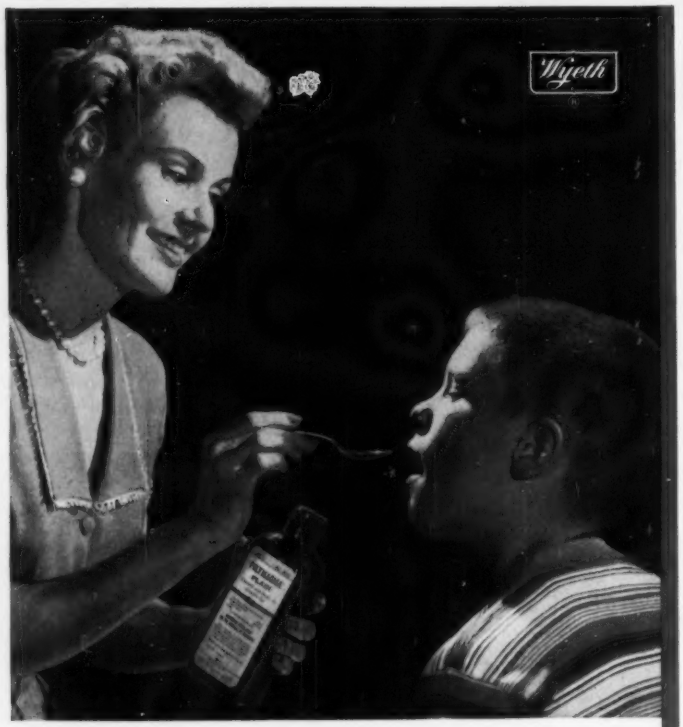


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Enormous surface area makes M & C Attapulgus Clay products highly-sorptive toward liquids, gases, and odors . . . fits them for jobs where high surface activity will solve problems . . . check this *starred item* on the coupon to learn more.

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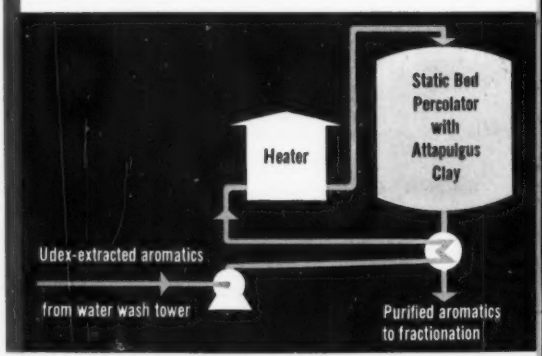
The Udex process, originated by Dow Chemical Company and developed and licensed by Universal Oil Products Company, uses glycol solvents in a liquid-phase extraction of high-purity aromatics from catalytic reformates, coke oven light oils, and other aromatic-rich hydrocarbon mixtures. Flexibility and economy of operation establish Udex popularity. Extreme purity aromatics are produced by liquid phase static bed percolation of the aromatics extract through Attapulgus Clay to remove traces of unsaturates and other impurities which would limit the purity of the final products.

Because of basic reaction, low affinity for aromatics, and ability to polymerize unsaturates, M & C's Attapulgus Clays are versatile adsorbents for purifying most hydrocarbon stocks. Contaminating trace elements removable from paraffin, cycloparaffin, aromatic hydrocarbons by these adsorbents are non-cyclic unsaturates, arsenic and nitrogen compounds, strong acid esters, acidic and basic compounds, resins, polymers, and selective solvents. Check these economical purifiers of petroleum and chemical feed stocks and products . . . use the coupon.

†*Registered trademark of Universal Oil Products Company*




# Minerals & Chemicals Corporation

7446 Essex Turnpike, Menlo Park, New Jersey

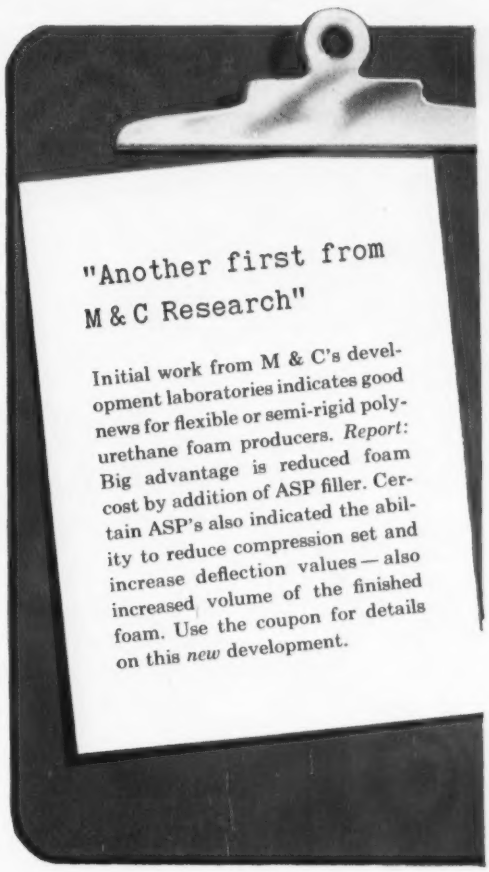
*Leaders in creative use of non-metallic minerals*

Export Department: Room 150, Garden State Parkway, Menlo Park, N.J. (Cable Address: "MICOR"

***Surface Coatings** capitalize on ASP® extender pigments to lower costs, improve performance

You name the surface coating—and if an extender is included in the formulation an ASP aluminum silicate pigment of some type, in some amount, can be or is being used. *Reason:* extensive M & C research has put ASP's in a working role for surface coatings—upgrading hiding power, durability and other "use" properties. For the complete story on this *starred* item use the coupon.

**Polyurethane Foam** studies show ASP fillers extend foam volume


"Another first from M & C Research"
Initial work from M & C's development laboratories indicates good news for flexible or semi-rigid polyurethane foam producers. *Report:* Big advantage is reduced foam cost by addition of ASP filler. Certain ASP's also indicated the ability to reduce compression set and increase deflection values — also increased volume of the finished foam. Use the coupon for details on this *new* development.

Use this quick two-check coupon ▶
- ✓ your product interest . . .
- ✓ what you need to get tests started . . . we'll fill your requests immediately.

*For more data, see your 1959 Chemical Materials Catalog, Pages 192-196*

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I'm interested in: ☐ • Pharmaceutical-grade Attapulgus Clays; ☐ Hydrocarbon treating adsorbents; ☐ • Paint Extender Pigments; ☐ Plastics fillers.

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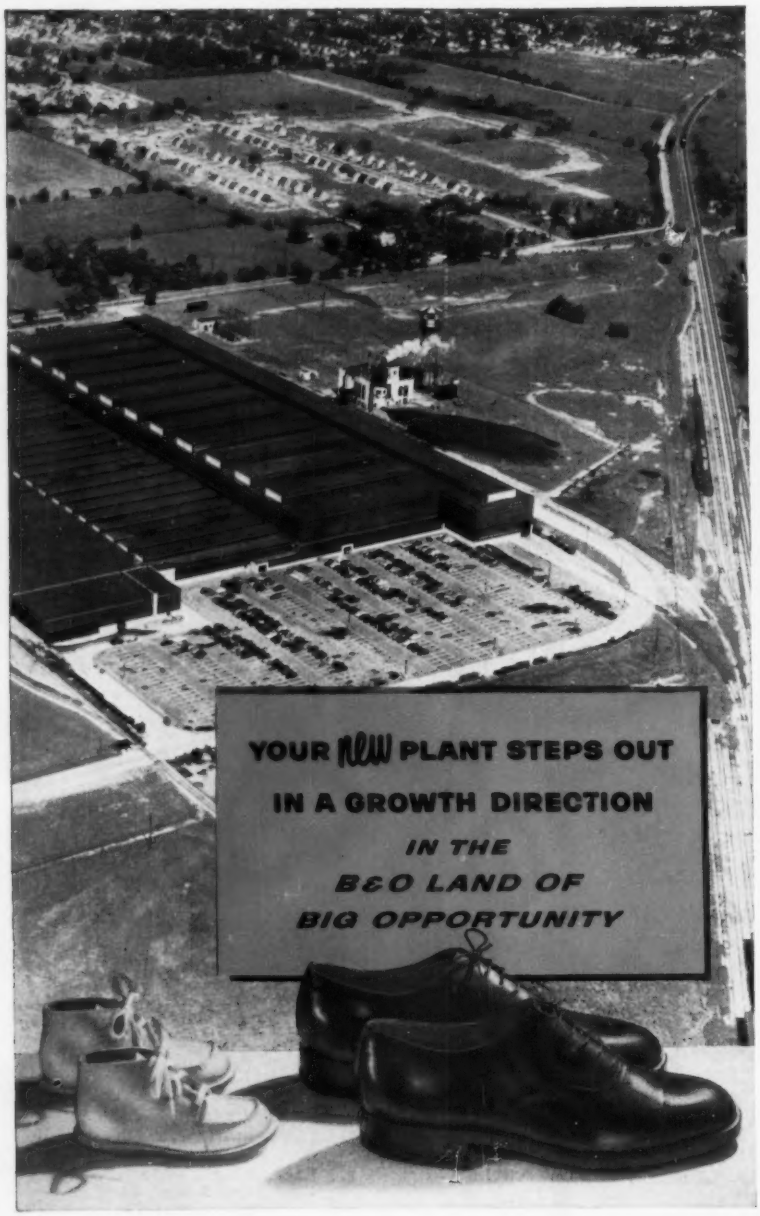


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# OPINION

## Ion-Exchange Addendum

TO THE EDITOR: We were very pleased to see the article "Process Pair Whittles Uranium Costs" *(CW, July 11, p. 35)*, especially since we designed the continuous ion-exchange contactor and conducted a flowsheet demonstration with the unit after Illinois Water Treatment Co. built it.

There are, however, two points we believe should be clarified. One is that more credit should be given two USAEC prime contractors, Union Carbide Nuclear Co. and General Electric Co., for the first actual process application of the Higgins contactor, well ahead of the Japanese plant. . . . The other is that Illinois Water Treatment Co. is erroneously described as our "exclusive licensee." While it is true that IWT and we are the only commercial suppliers of the Higgins contactor at present, their license is nonexclusive and revocable. In addition, USAEC, Union Carbide Corp. and Dow Chemical Co. have internal-use-only licenses under my patent rights. . . .

IRWIN R. HIGGINS
President
Chemical Separations Corp.
Oak Ridge, Tenn.

*CW's intention in its story was to highlight the commercial applications outside of the government's atomic program.*—ED.

# MEETINGS

**American Chemical Society,** national meeting, Atlantic City, N.J., Sept. 13-18.

**Technical Assn. of the Pulp and Paper Industry,** ninth corrugated containers conference, Jung Hotel, New Orleans, Sept. 15-17.

**Drug Chemical and Allied Trades Section** of the New York Board of Trade, 69th annual meeting, Sagamore Hotel, Bolton Landing, Lake George, N.Y., Sept. 17-19.

**Canadian Agricultural Chemicals Assn.,** seventh annual meeting, Chateau Frontenac, Montreal, Sept. 20-23.

**Technical Assn. of the Pulp and Paper Industry,** 14th paper-plastics conference, Edgewater Beach Hotel, Chicago, Sept. 21-23.

**Instrument Society of America,** 14th annual instrument automation conference and exhibit, International Amphitheater, Chicago, Sept. 21-25.

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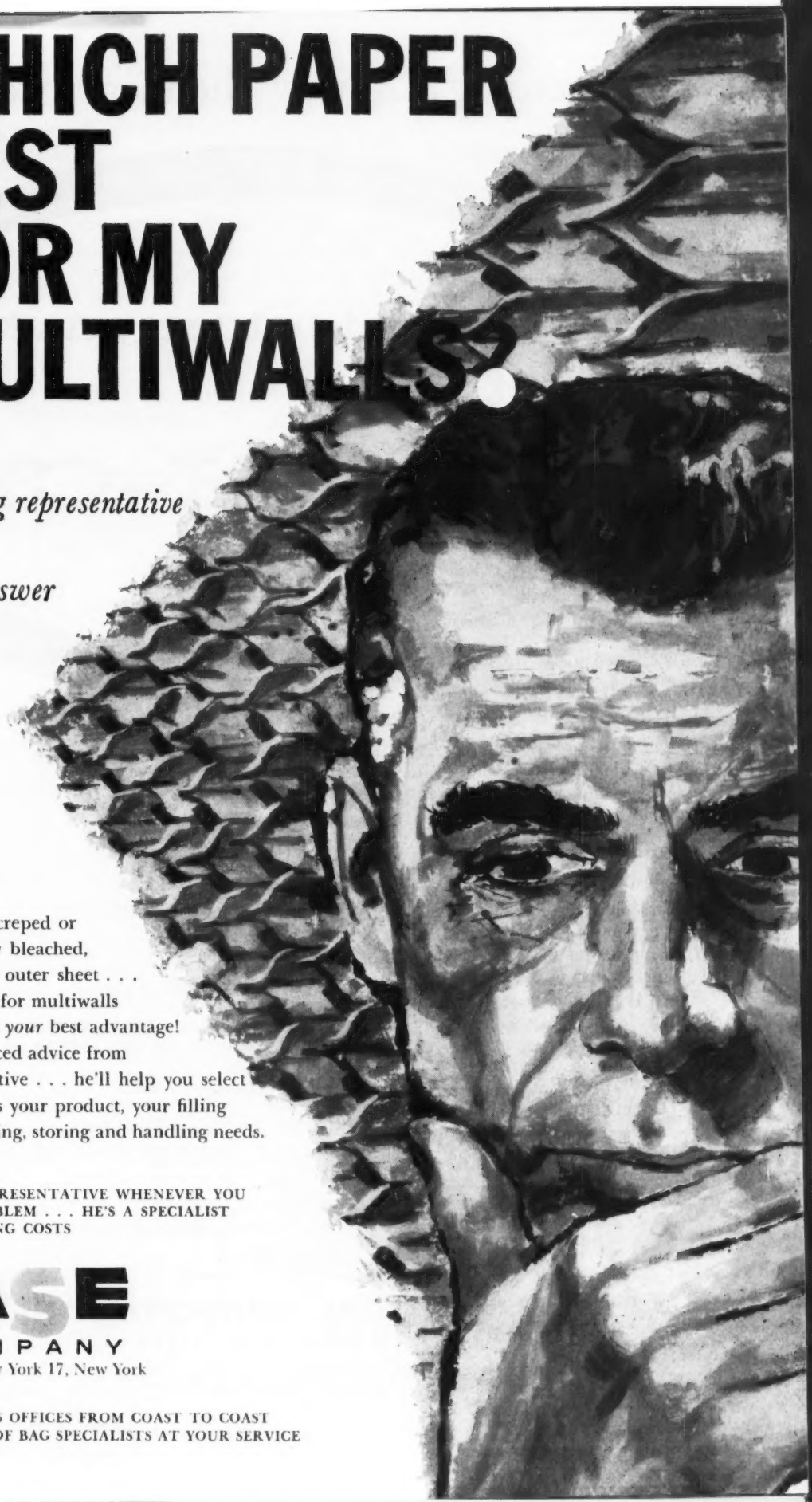

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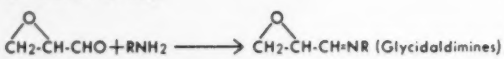
# *Announcing*... a new chemical intermediate

## Glycidaldehyde*

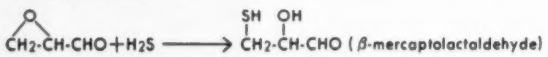
HERE is a new and promising acrolein derivative which combines aldehyde and epoxide functions in the simplest possible structure—while retaining the distinctive chemical characteristics of both these important groups.

Glycidaldehyde's highly reactive carbonyl group condenses with a variety of reagents, including amines and other active hydrogen compounds, leaving the epoxide ring intact. Other reagents may attack only the epoxy group, leading to β-substituted lactaldehyde derivatives. Both groups can be reacted simultaneously with properly chosen reagents and conditions.

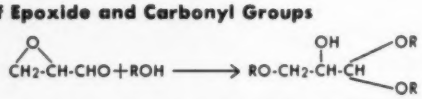
**Reactions of Carbonyl Group**




**Reactions of Epoxide Group**




**Reactions of Epoxide and Carbonyl Groups**




(acetals of β-alkoxylactaldehydes)

**Uses:** Glycidaldehyde is suggested for use in modifying textiles, paper, leather and similar products by reactions of carbonyl and/or epoxide groups. It is also suggested for evaluation as a means of improving adhesion of polymers containing hydroxy, mercapto, and amine groups by interaction with either of its functional groups. It may be used to modify many polymer systems, such as phenolics, polyesters and amino resins.

**Availability:** Research quantities of glycidaldehyde are available. Your letterhead request will bring you technical information and samples you require.

Please send your inquiries for literature and samples to:

Shell Development Company
4560 Horton Street
Emeryville, California

*** Physical Properties of Glycidaldehyde**
a stable, colorless and mobile liquid

| | |
|---|---|
| Boiling Point, °C. | 112-113 at 760 mm Hg |
| Flash Point, °F. (Tag Open Cup) | 88 |
| Solubility | Completely soluble in all common solvents. Insoluble in pet. ether. |

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SHELL

# Business Newsletter

CHEMICAL WEEK
September 12, 1959

**As European chemical producers build new capacity** in preparation for the coming "Common Market" sales boom (*see p. 37*), U.S. companies are joining in by piling up their own investments. Latest example: the decision by Union Carbide and Italy's Societa Edison to double capacity of their 50-50-owned Celene polyethylene plant abuilding at Priolo, in Sicily.

Edison—Italy's No. 2 chemical producer—also has ties with Monsanto and Chemstrand (*CW, March 14, p. 28*). The joint venture started with a 30-million-lbs./year polyethylene plant, due onstream in the fourth quarter of this year. Then, last winter, plans were laid to add a 26.5-million-lbs./year ethylene oxide and derivatives plant. The latest expansion will add another 30 million lbs. to polyethylene capacity, will also broaden production to include ethanol, butanol, 2-ethyl hexanol, and ethanolamines.

•

**The current spate of oil company mergers** is creating bigger and better springboards for petrochemical ventures. Principal motives for most of these mergers—increased operating efficiency and better sources of domestic crude oil—are factors in petrochemical as well as in petroleum operations.

In the latest of these moves—the plan to consolidate domestic operations of Standard Oil Co. of New Jersey and its 98.27%-owned Humble Oil & Refining Co.—some details concerning petrochemicals have not yet been worked out. The new company (retaining the Humble name) will do the petrochemical manufacturing, since it will be operating all the refineries. Not yet decided: whether the Enjay petrochemical marketing organization will become a part of the new company.

And a comparable move by Socony Mobil Oil Co. concerns the big new high-purity ethylene plant—said to be the world's largest—now going up at Beaumont, Tex. The parent company's domestic operations are being combined with those of its three principal wholly owned U.S. affiliates.

Result: a single coast-to-coast operating unit, Mobil Oil Co. Thus, Mobil Oil will take over the olefin plant at Beaumont, which has been a project of Magnolia Petroleum Co.; the Petroleum Chemicals Dept. recently organized by General Petroleum Corp.; and various delayed-coking units, sulfur-recovery units and other petrochemical and chemical operations of Magnolia, GP and Mobil Producing Co.

Other proposed and consummated oil company mergers—involving such "majors" as Texaco, Tidewater, Royal Dutch/Shell, and Sinclair—may also have significance in terms of petrochemical industry growth rate.

**Paint and varnish makers will likely get lower freight rates.** The Interstate Commerce Commission granted an incentive rate scheme that cuts rates in proportion to volume and distance for paint and varnish shipments in Eastern rail territories. But the language of the decision left much doubt if a precedent for other chemical commodities is firmly established. Rail carriers had sought a sweeping ICC ruling that would establish the validity of the rate cut for many other cases. This, however, the ICC refused to do.

•

**Taking pains not to ruffle public opinion,** Omni Products Corp. (New York) says it will sell to the U.S.S.R. equipment for a complete 10,000-tons/year plastics extrusion plant. It will produce polyethylene and polyvinyl chloride pipe for irrigation.

In revealing the sale, Omni quoted a recent statement by Secretary of Commerce Frederick Mueller backing "mutually advantageous" trade with the Soviet Union. The deal, Omni says, had full governmental approval before negotiations began. Unlike most Soviet plant contracts, the Omni deal calls for plant construction and equipment installation to be handled by the Russians. The Manufacturing Chemists' Assn. has issued a strong statement against selling Russia know-how, but says this policy does not cover the Omni deal, in which Russia's primary gain will be in saving production time on badly needed equipment.

**But European producers are willing to sell the Soviets technology** as well as equipment. British and West German firms, in particular, are in hot competition for Russian contracts. But Italy's Montecatini recently signed one of the most significant deals so far. It will provide both equipment and processes to enable the Soviets to make maleic anhydride, titanium dioxide, acetylene, and ethylene from crude oil.

•

**Meanwhile, Communist China's chemical needs** are providing a small but attractive market for producers outside the U.S. In the latest deal, China signed a one-year contract to import 500,000 tons of phosphates from Morocco as part of a trade agreement which had been drawn up a year ago.

•

**You can discount reports the Pentagon's infatuation with lithium** is behind the recent cancellation of boron fuel contracts (*CW, Aug. 22, p. 21*). A publication addressed to the rocket industry came out last week with a speculation that the Defense Dept.—rating lithium compounds ahead of boron on various counts—might now turn to lithium as a base for "exotic fuels," now that the Atomic Energy Commission is no longer buying most of the lithium companies' output. Not so, says the Office of Defense Research & Engineering. Research is under way on use of lithium compounds in rocket propellents—but lithium is not being considered as a fuel for air-breathing aircraft such as the B-70 "chemical bomber."

# BRIEFS

**on a heat-stable molecule . . . an easier way to chlorinate and sulfonate . . . a tip from a tanner**

## How to make plastics resist fire

If you want to build heat stability into a plastic product, it will pay you to look at *tetrachlorophthalic anhydride,* trade-named NIAGATHAL.®

Nearly half its molecular weight is concentrated in four chlorine atoms, providing a very stable compound that won't melt unless you heat it to 254°-255° C.

Translate these properties to read "fire resistance," "heat resistance," "good electrical qualities"—if, for example, you're adding NIAGATHAL to a polyester resin.

It's most effective in polyesters containing pigment or other filler—lets you load as much as 22% stable chlorine into such resins. When you do this, you come up with a polyester that is inherently, permanently self-extinguishing.

To help you evaluate this chemical, we've put together, in bulletin form, several published papers reviewing its properties, solubilities and its many reactions and suggested uses, as well as suggested uses of derived compounds. To get a copy, just check the coupon for *Bulletin 46.* Our technical data sheet may help you, too.

## A tanner could tell you . . .

what can happen if sodium sulfide picks up iron.

Blue blotches are likely to develop in his leather.

The five steps we take to help tanners avoid this trouble may help *you,* if you process with sodium sulfide:

1. We use our own caustic soda plus high purity hydrogen sulfide in making sodium sulfide. Thus, we keep close control of its composition.
2. We always ship your sulfide in new drums.
3. The drums are lacquer-lined to prevent iron contamination.
4. Six sturdy lugs hold the drum lid tight—even with rough handling.
5. Each lid is lacquer-sealed to keep your sulfide at full strength.

**Easy to pour.** The large opening lets you dump or scoop out the sulfide easily and quickly.

**Fast dissolving.** You don't need to stir Hooker sodium sulfide. The clean, strong flakes dissolve right into process. You neither wait nor decant.

Check the coupon for complete data.

## Chlorinate or sulfonate with this interesting inorganic

Sometimes you'll find it's easier to work with thionyl chloride than with pure chlorine or sulfur.

It makes an excellent chlorinating agent. You can also use it to introduce sulfur or oxygen and sulfur.

You can get Hooker thionyl chloride in two grades. The technical grade is 93% pure min. and distills between 72° and 79° C. It is shipped in steel drums.

You get 97.5% min. purity when you buy the refined grade. It distills between 75° and 78° C. and comes to you in glass carboys or in nickel drums. It contains less than 5 ppm iron.

Our data sheet on thionyl chloride will give you more technical data. Why not send for it today?

**For more information** on the chemicals mentioned, check here:

- ☐ Niagathal (Tetrachlorophthalic Anhydride) Bulletin 46 and data sheet
- ☐ Thionyl Chloride
- ☐ Sodium Sulfide

**Clip and mail** to us with your name, title, and company address. *When requesting samples, please use business letterhead.*

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Today, C&I designed plants are operating successfully in many major areas of the world, and more are continually being developed. In fact, the world over, C&I's complete engineering and construction facilities are at work for the steadily growing chemical and fertilizer industries. C&I is well equipped to handle these projects in detail, from preliminary planning, cost analysis, market research, engineering, design and construction -- to the completed installation. These modern plants are constructed to rigid specifications and the over-all efficiency and capacities are guaranteed.

If you are considering expansion of present facilities, or the establishment of a new location, it will pay you to consult C&I.

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# ... available world-wide

**Nitric Acid**
(High Pressure, Self-sustaining)

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**Prilled Ammonium Nitrate**

**Ammonium Nitrate**
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(Prayon Process)

**Sulfuric Acid**

**Ammonium Phosphate**

**Oxygen**

**Fume Eliminator**

**Oil Absorber**

Existing plants designed and constructed by C & I are represented here by the flags throughout the world. Due to the Earth's curvature, some of the plants cannot be shown.

corporation • cincinnati 26 • ohio

When you think of epoxy resins come to the people who pioneered in the development and manufacture of them!

## epi-cure 855

***A New Flexibilizing Type Curing Agent For Improved Resilience***

EPI-CURE 855 is a new and modified aliphatic amine curing agent for EPOXY resins, which has resulted from continuing development in the Jones-Dabney Laboratories, where EPOXY resins were developed.

For casting compounds, laminated structural parts, potting and encapsulating EPI-CURE 855 provides several unique advantages. Lower viscosity improves mixing and handling ease, eliminates the use of diluents in many cases, and often lowers the cost of finished compounds.

Complete compatibility with EPI-REZ 510 and similar resins allows faster and more uniform mixing. Bubbles come out faster and preheating and waiting periods before application are eliminated. Now you can handle compounds at lower temperatures with less sweat-out. Longer pot-life permits larger batches and more time for application. After application there is more time for bubbles to surface and break resulting in better wetting.

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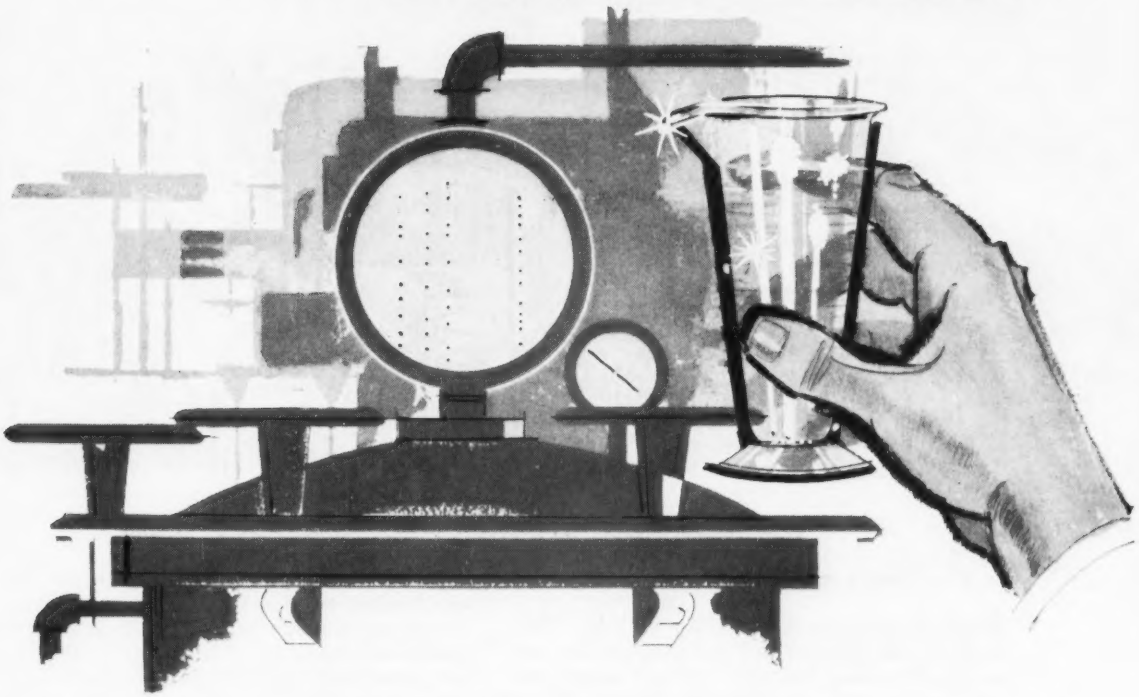
EPI-REZ® meets the most rigid specifications set by the Plastics Industry and is available in drum lots, or 6,000 gallon tank cars. Jones-Dabney's Epoxy Specialists can assure you the most advanced technical information available in the field. No need to look further . . . Come to the people who developed them.

# New Standards of Filtration Control



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Non-organic, Eagle-Picher filter aids are sterilized . . . are chemically and physically inert. Cannot alter or impart flavor.

You get "sharp" filtration that removes all thermophiles and unwanted solids in the colloidal and submicroscopic range.

The unmatched purity of Eagle-Picher Filter Aids results in a lower wet density, providing greater surface coverage. Users report substantial production economies.

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☐ Please send additional information
☐ Please submit sample_____ (size needed)
Type Product to be filtered

Filter-Aid to be used for:
☐ Primary filtering ☐ Pre-coat
☐ High clarity or polishing ☐ Admixture

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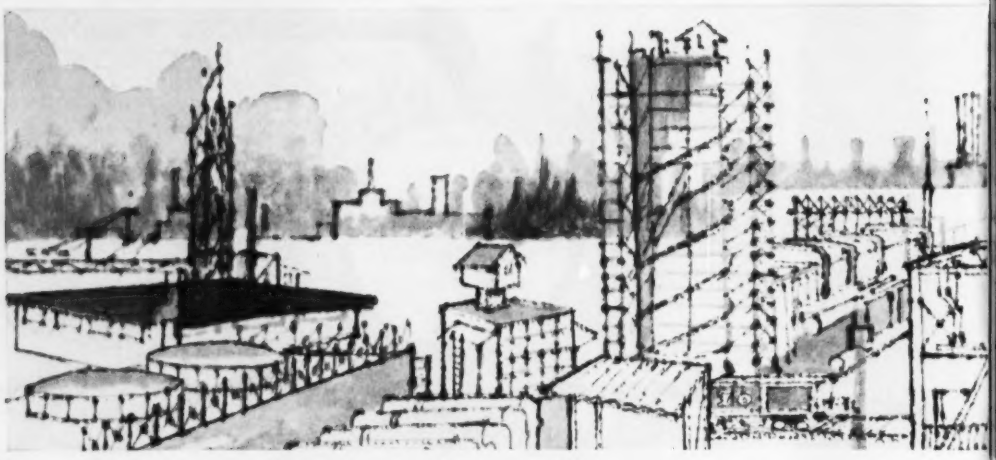
# ENGINEERING AT ITS BEST



WHAT YOU SHOULD EXPECT

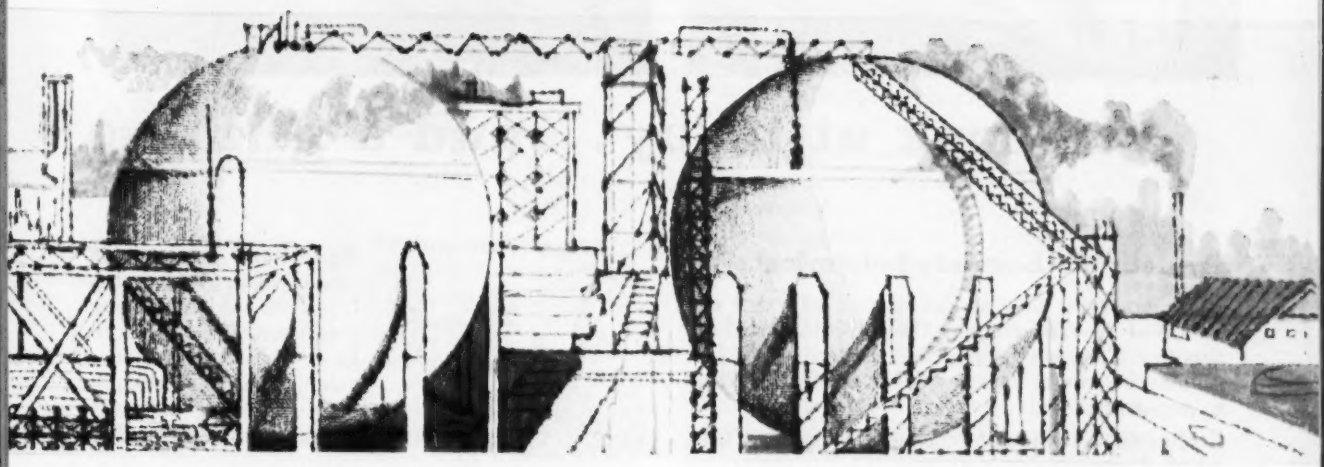
When you go to an engineering firm for help in the design and construction of a new plant, or the expansion of existing facilities, you have a right to expect certain basic standards from that firm. They should have EXPERIENCE, for only with past experience can you minimize the number of new problems which will arise on any new project. Such experience, however, should be tempered with FLEXIBILITY, CREATIVITY and VISION. Some companies are experienced beyond measure at building plants from designs more than 25 years old. In the highly competitive years ahead, such plants could prove economically unsound. You owe it to your company's future to select a firm which has proven its ability to provide the newest and the best in process engineering.

For almost half a century, CHEMICO has maintained a reputation for progressive and imaginative process design and improvement. This proven "know-how" is available to firms in the chemical and petrochemical fields requiring any and all types of engineering and construction services.

WAYS OF WORKING WITH THE CLIENT

A recently completed petrochemical plant offers the best example of the several ways in which CHEMICO is prepared to work with its clients. This huge complex was designed to produce acetylene derivatives, and included processes for producing a wide range of basic chemicals. The ammonia, sulfuric acid and ammonium sulfate sections of this plant were based on *Chemico's own proprietary processes.* The designs for the acrylonitrile and hydrogen cyanide units were based on processes developed in the *client's own pilot plant.* For the acetylene plant, CHEMICO *obtained a license* from BASF in Germany for their patented production-proven process. The oxygen plant was designed by the Linde Company of Germany on a *sub-contract basis.* CHEMICO's Construction Department was responsible for erection of all the plants, and CHEMICO's Industrial Projects Department supervised, coordinated and controlled the entire project.

CHEMICO is always prepared to provide its services to clients on any or all of the bases indicated above. For clients with processes of their own, CHEMICO's Industrial Projects Department will engineer and construct plants, starting at any stage of development. CHEMICO's own laboratories and pilot plant are available, if desired, for process development and improvement work on a contract research basis. If the process to be employed has already undergone pilot stage testing, CHEMICO will design the most economic and efficient commercial scale operation. In such a case, the client can be sure that CHEMICO will call on the services of outstanding engineers and technical personnel with experience similar, or related to the unit operations which are to be designed, engineered and constructed. In addition, the client can be assured that CHEMICO, as an independent engineering organization, will undertake such activities in the framework of a completely confidential relationship,



with all necessary safeguards for protecting the client's competitive position in regard to trade secrets and research developments.

In the case of clients who want plants to produce products for which neither CHEMICO nor the client has a process, CHEMICO, through its Industrial Projects Department, will obtain licenses from whatever source possible for production-proven process designs which will enable the engineering and construction of the desired plant.

Very often CHEMICO's drafting force as well as its specialists in civil engineering, mechanical engineering, electrical engineering and other service engineering capacities can be made available to clients on an individual contract basis. CHEMICO's construction organization, made up of a permanent force of highly experienced construction superintendents, is prepared to undertake a wide range of erection projects related to the process industries.

## CONTRACT ARRANGEMENTS

CHEMICO offers its clients a wide choice in the type of contract under which each individual project is to be handled. Among the more common arrangements—although by no means the only ones available—are the following:

*Cost Plus Fixed Fee:* Under this type of contract, CHEMICO's fee and overhead charge for engineering, construction and related services is decided by mutual agreement, and the client is billed at direct cost for any and all expenses incurred by CHEMICO to complete the client's project.

*Lump Sum:* At the client's request, CHEMICO submits a firm estimate containing a specific price for which CHEMICO will undertake to complete the client's project.

*Guaranteed Maximum:* Under this type of contract, CHEMICO will set a maximum cost to the client for an individual project. If the cost of the project falls below the maximum figure, all savings will be divided between CHEMICO and the client on the basis of a prearranged rate.

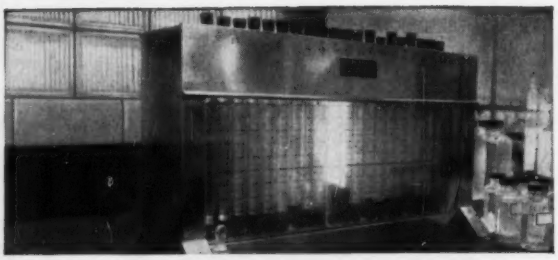
*Fixed Price Equipment Supply:* Under this type of contract, the client gets the benefit of CHEMICO's design, engineering, purchasing and expediting services, but is free to make his own arrangements for the construction of his project.

*Basic Design and Construction Supervision:* This type of arrangement has proved extremely useful in dealing with clients outside the United States. Ordinarily, under a contract of this sort, CHEMICO provides the basic engineering for a project, and the client makes other arrangements for the detailed drawings and construction. CHEMICO then supervises construction and sees the project through start-up operations.

CHEMICO

**CHEMICAL CONSTRUCTION CORPORATION**
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO



# A look at today...and a glimpse

## Armour's ethoxylated chemicals

Most industries have surfactant problems that can be solved by Armour's versatile polyethoxylated derivatives. These compounds range from completely oil soluble to completely water soluble, and from cationic to non-ionic in activity.

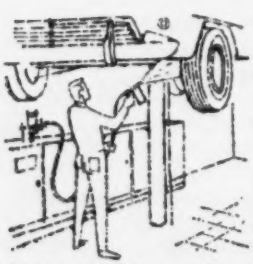
More than 40 different chemicals offer you a wide range of properties to work with in solving your own surfactant problems. This great flexibility assures you exactly the right combination for each application. And with the recent expansion of our etho-chemical unit at McCook, Illinois, prices of these compounds have been reduced.

The etho-chemicals fall into five major groups—the Ethomeens®, Ethoduomeens®, Ethomids®, Ethofats® and the newly introduced Ethoquads®.

## Where Armour's ethoxylated chemicals work today

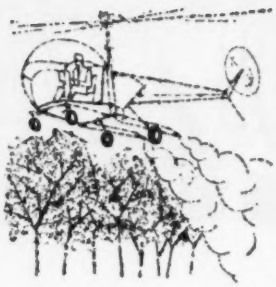
**Mineral oil emulsions.** In processing paper and textiles, three properties make Ethomeen S/15 (polyethoxylated soya amine) an important cationic emulsifying agent for mineral oils. These properties provide: (1) effective anti-static results; (2) increased ability to adjust the stability of emulsions; and (3) excellent hard water tolerance. Because this chemical provides an anti-static property to emulsions, it is especially valuable when working with wool and synthetic fibers.

*For more information, check "A" in the coupon.*



**Sound absorbers.** Improved sound-proofing compounds are being made by wetting asbestos or fiber fillers rapidly and uniformly with chemically-treated asphalt. The chemical that makes it possible is Ethoduomeen T/13 (a polyethoxylated N-tallow diamine). It's proving to be a vital ingredient in many asphalt-based undercoating materials for automobiles and in several important industrial sound-deadening compounds.

*More technical data is available. Check "B" in the coupon.*



**Agricultural emulsifiable concentrates.** Many manufacturers are discovering that non-ionic Ethofats can be combined with either anionics or cationics to produce far more efficient blends of emulsifiers. For example, improved emulsification of the oil solutions of DDT, chloradane, toxaphene, and 2-4-D is being obtained by using an Ethofat.

Ethofat C/15 (polyethoxylated coconut fatty acid) and Ethofat 242/25 (polyethoxylated rosin fatty acid) are proving to be excellent wetting agents for wettable powders in several pesticide formulations.

*Want more details? Check "C" in the coupon.*

**Silicone emulsions.** Major silicone suppliers are today recommending Armour's Ethomids as non-ionic emulsifiers for silicone resins. Ethomid emulsions are stable in both concentrated and dilute form. They show little tendency to rewet or yellow, and are compatible with most finishing resins. Ethomid HT/15 (polyethoxylated hydrogenated tallow fatty amide) and Ethomid 0/15 (polyethoxylated oleamide) are currently being used in this particular application.

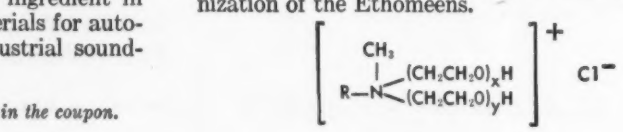
*Check "D" in the coupon for more complete information.*

**Pigment dispersion.** Ethomeen S/12, when combined with other Armour cationics, offers manufacturers a unique system of coating organic and inorganic pigments. The Ethomeen greatly improves the dispersion of these pigments in paints, plastics, and rubber. Other Armour etho-chemicals also are demonstrating their ability to perform as dispersants. Because of the large number of different pigments and vehicles available, Armour welcomes the opportunity to recommend the proper etho-chemical for your requirements.

*For technical data, check "E" in the coupon.*

## Chemical structures

**The Ethoquads®** are a new series of polyethoxylated quaternary ammonium compounds formed by quaternization of the Ethomeens.



# of tomorrow

*from Armour Chemical*

**The Ethomeens®** are prepared from n-alkyl primary amines. They have an ethylene oxide content ranging from 2 to 50 moles per mole of amine.

$$RN\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

**The Ethoduomeens®**, like Ethomeens, are reaction products of amines and ethylene oxide. The difference: Ethoduomeens are obtained by the ethoxylation of n-alkyl trimethylene diamines.

$$R-N(CH_2CH_2O)_zH-CH_2CH_2CH_2N\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

**The Ethomids®** are N, N-substituted fatty acid amides. The substituents being polyoxyethylene groups. The Ethomids are chemically neutral and rather unreactive.

$$RCN\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

**The Ethofats®** are mono-fatty or rosin acid esters of polyoxyethylene glycols. These esters are fairly stable in mildly acid or alkaline solutions. They can, however, be hydrolyzed by refluxing with strong acids or alkalies.

$$RCO(CH_2CH_2O)_xH$$

## Armour's ethoxylated chemicals tomorrow

Armour research with the etho-chemicals finds their versatility to be virtually unlimited.

Examples: Ethomeens are suspending high density metallic fines in selected oil systems. Ethoduomeens are being evaluated as building blocks for asphalt adhesion additives and as cationic asphalt emulsifying agents. Many etho-chemicals show great promise as internal anti-static agents in polyvinyl chloride and polyvinyl acetate-polyvinyl chloride copolymers.

**Investigate the Ethoquads, Ethomeens, Ethoduomeens, Ethomids and Ethofats. Find out what they're doing in your industry. Send the coupon or call Armour today.**


## NEWS NOTES

**Chicago.** Recent modifications in pilot plant production and analytical methods now assure more uniformity in alpha sulfoalkyl acids . . . $RCH(SO_3H)COOH$. New samples of alpha sulfopalmitic and alpha sulfosteric acids are now available from Armour.

•

**Barcelona, Spain.** The first shipment of Ethomeen to this country arrived from New York. These ethoxylated aliphatic amines are finding widespread use in the country's expanding synthetic fiber industry.

•

**Akron, Ohio.** Armour's oleyl nitrile, Arneel® OD, is replacing Arneel SD (soya nitrile), as a synthetic rubber plasticizer. Recent tests show this particular Arneel offers a greatly reduced odor level, more uniform consistency and slightly improved physical properties at low temperatures.

•

**McCook, Ill.** Production of the Ethofat 142 series was recently discontinued with the introduction of Ethofat 0/15 and 0/20. In addition to the new products having equivalent emulsifying characteristics, they have a very low percentage of linoleic acid which minimizes oxidation. The Ethofat O series, unlike the Ethofat 142 series, contains no rosin acids.


**Armour Industrial Chemical Company**

A Division of Armour and Company

**How can the etho-chemicals help you?**

Check here for more information on your field of interest.

☐ A ☐ B ☐ C ☐ D ☐ E

Send sample for this application:

_____

_____

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

CITY_____STATE_____

Armour Industrial Chemical Company
110 North Wacker Drive • Chicago 6, Ill.

CW-9-59

# CHEMICALS OUTLOOK

September, 1959

**This news bulletin** about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

## PLURONIC POLYOL USED AS PAPER-COATING COLOR STABILIZER

One of the liquid members of Wyandotte's Pluronic* series of difunctional block-polymers, Pluronic L62, has been found to offer certain specific advantages as a stabilizer for starch-styrene butadiene latex paper-coating colors.

Added directly to the coating formulation, Pluronic L62 eliminates the handling and preparation required with casein, and is not subject to bacterial decomposition over short periods of time. At a concentration of 3% to 5% (based on the weight of latex solids), it is an excellent emulsion stabilizer ...and further, acts as a foam depressant.

In addition, Pluronic L62 has a favorable viscosity reducing effect that is of particular value where the new trailing-blade coaters are used.

Since there is a possibility that it would increase the water sensitivity of coated surfaces to a slight degree, Pluronic L62 is not suggested for papers to be used for offset printing — nor, at the present time, is it recommended for use in papers that will come into contact with food. In all other cases where starch and latex are used in combination as the adhesives for paper-coating colors, Pluronic L62 is offered for consideration. Samples for evaluation in your own laboratory — along with literature on the complete Pluronic series — are available upon request.

## NEW COMPARTMENTED TANK CARS ADDED TO WYANDOTTE FLEET

The addition of new 4,000- and 8,000-gallon compartmented cars to the Wyandotte tank-car fleet enhances our ability to handle mixed bulk shipments. With two compartments of equal size, the new tank cars permit customers — who want small amounts of two products — to order in bulk quantities of as little as 2,000 gallons. Thus, you can take advantage of the lowest price for each of two products when purchasing Wyandotte's Quadrol*, ethylene glycol, diethylene glycol, and all liquid grades of Pluronic and Tetronic* polyols.

For more detailed information on Pluronic polyols in paper applications, or on compartmented tank-car shipments... write us direct, on your company letterhead. Address inquiries to Department CO for prompt attention.

*REG. U.S. PAT. OFF.

**Wyandotte CHEMICALS**

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE • MURIATIC ACID • HYDROGEN • DRY ICE
PROPYLENE DICHLORIDE • SYNTHETIC DETERGENTS • SODIUM CMC • ETHYLENE OXIDE • ETHYLENE DICHLORIDE • POLYETHYLENE GLYCOL • PROPYLENE OXIDE
GLYCOLS • POLYPROPYLENE GLYCOL • DICHLORODIMETHYLHYDANTOIN • CHLORINATED SOLVENTS • OTHER ORGANIC AND INORGANIC CHEMICALS

KRAFT BAG CORPORATION, through correct construction of your multiwall shipping sacks, will reduce seepage and spoilage of contents while minimizing your shipping and storage problems.

*If your product fits into a bag –*
*let us make the bag to fit your product!*

# KRAFT BAG CORPORATION

*Gilman Paper Company Subsidiary*
**630 Fifth Ave., N.Y. 20, N.Y. • Daily News Bldg., Chicago 6, Ill.**
*Integrated mills at St. Marys, Georgia and Gilman, Vermont*

Gilman PAPER CO.
• St. Marys Kraft Corp.
• Gilman Paper Co.
• The Gilbreath Co.
• Kraft Bag Corp.

**Our Newest**
**KRAFTPACKER**

Open Mouth Bag Filling Machine provides maximum accuracy and speed. May we tell you about our stainless steel models? Remarkable in performance. Surprisingly low in price.

☐ We are interested in improving our bag.
☐ We are interested in your Kraftpacker.

CW

NAME OF COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____ PRINCIPAL_____

PRODUCT MFD._____

# Just what is the Land of Plenty?

**The Land of Plenty . . . that's the name given by the Norfolk and Western Railway to the six progressive states it serves. A name that sums up, in three short words, the unsurpassed industrial advantages of this area.**

**A Major Market for Industry:** Embracing the fast-growing states of Ohio, West Virginia, Maryland, Virginia, North Carolina and Kentucky, this is a rich market for industry. Here, too, industry can reach overseas markets via the modern Port of Norfolk on famed Hampton Roads.

**Rich in Raw Materials:** In this six-state area are vast reserves of superior all-purpose Bituminous Coal, large deposits of high-quality limestone, huge quantities of low-grade iron ore, and many other minerals. Mighty rivers, lakes and untapped underground sources provide ample water for industry. One-sixth of the nation's electric generating capacity is available.

**Friendly, Industrious People:** Manpower in the Land of Plenty has much to offer industry. Self-reliance and dependability are traditional. These are people who draw strength from a rich historic past . . . who have proven records of high production, who love their land and their homes.

Let us tell you more about the Land of Plenty and about the opportunities it offers new industries. Give us your requirements in strict confidence and without obligation.

*Phone, Wire or Write:*

L. E. Ward, Jr., Manager
Industrial and Agricultural Dept.
Division CW-846 (Phone DIamond 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia

**Norfolk and Western Railway**

## If you need a good non-staining, non-discoloring antioxidant . . . write for technical service reports on Neville Nevastains*

Neville manufactures two excellent non-staining, non-discoloring antioxidants under its tradename "Nevastain". Nevastain A is in liquid form with very low volatility and good stability. Nevastain B was developed for those who prefer the product in flaked form. It is shipped in sturdy 50-pound bags for easy weighing and handling.

In many instances, both Nevastains have proved themselves in formulation to be equal or superior to products of considerably higher cost.

We suggest that you may benefit by using the coupon below to write for our technical reports.

**Neville Chemical Company, Pittsburgh 25, Pa.**

**Resins**—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash*, Wire Enamel Thinners, Nevsolv*.

*Trade Name

NEVILLE

Please send Technical Service Report on Nevastain A. ☐
Please send Technical Service Report on Nevastain B. ☐

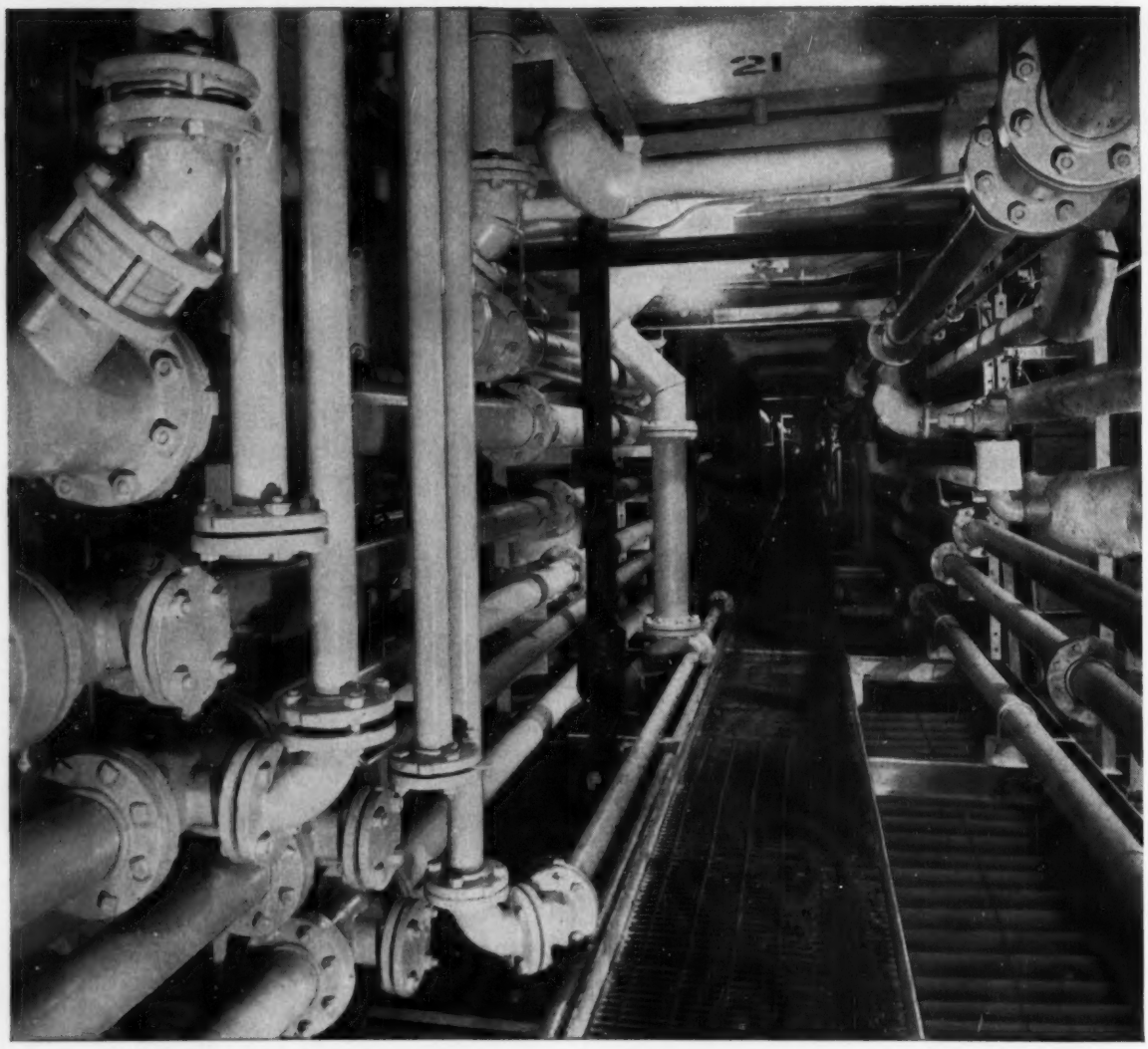
NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ CW STATE _____

DOW | **SARAN LINED PIPE**




# After six years of hot sulphuric acid . . .

## Saran Lined Pipe still performs dependably

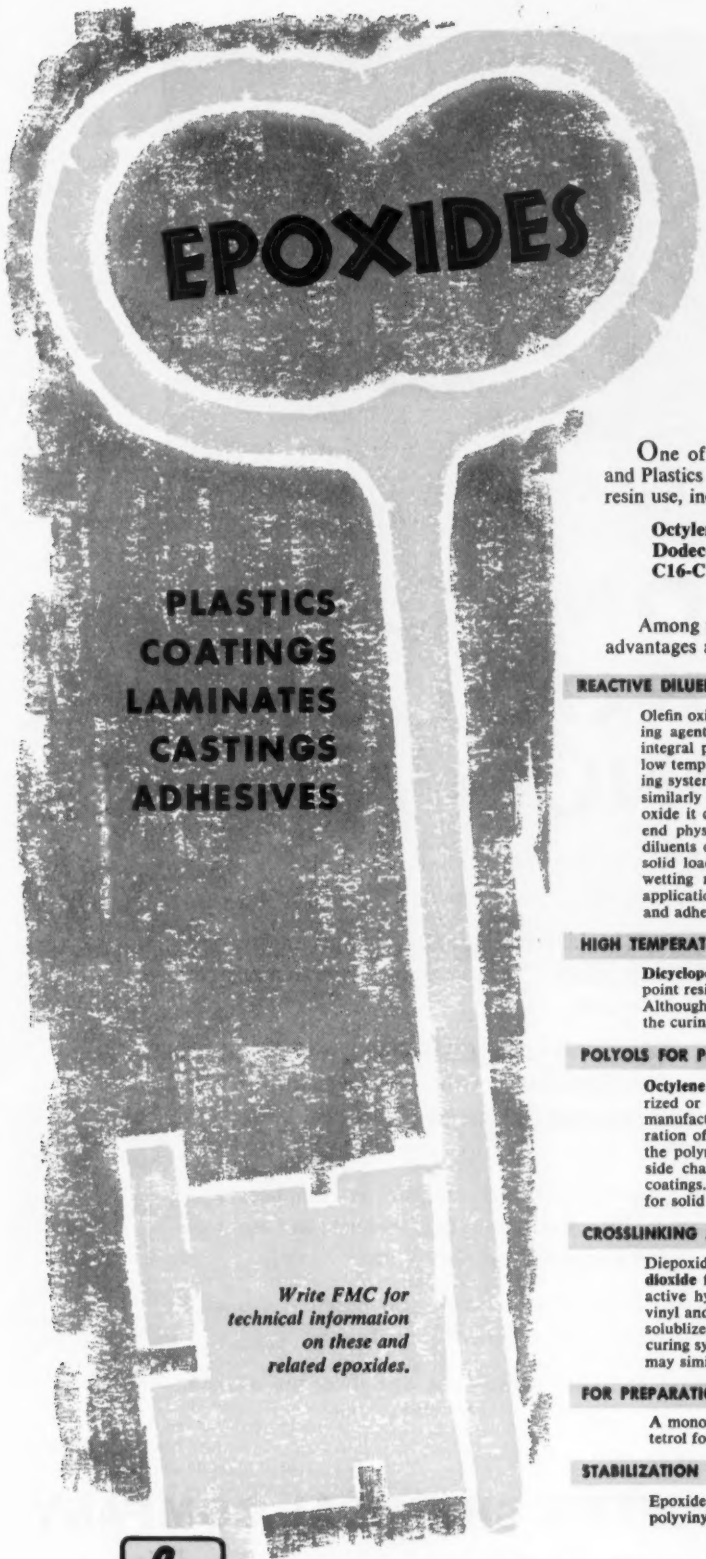
When 20,000 linear feet of pipe must carry a constant stream of hot sulphuric acid . . . when production requirements make pipeline failure intolerable . . . pipeline dependability is the lifeline of the plant. For the past six years, Saran Lined Pipe has carried dependably an unending flow of corrosive chemicals at Industrial Rayon Corporation's Painesville, Ohio, plant.

The installation shown above carries hot sulphuric acid and other chemicals used in Industrial Rayon's Continuous Process method of making tire cord. This Saran lined supply and return piping, serving all of the plant's spinning machines, carries the solutions from lower levels to spinning machines on the main floor. Pumping pressures range from 45 psi upward, and solution temperatures are above 125° F.

The Saran Lined Pipe was installed in 1953 and has been in continuous use since. Maintenance costs have been extremely low and I.R.C. engineers report that, during these six years, Saran Lined Pipe has performed dependably under their corrosive operating conditions.

Whenever dependable piping systems are required, whatever the degree of corrosion or chemical activity, consider Saran Lined Pipe. Saran Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200° F. They can easily be cut, fitted and modified in the field without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale, Michigan, Dept. 2282AM9-12

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**




# ...the key to improved resin formulations

**PLASTICS**
**COATINGS**
**LAMINATES**
**CASTINGS**
**ADHESIVES**

*Write FMC for technical information on these and related epoxides.*

One of the major suppliers of epoxides, FMC Chemicals and Plastics Division offers a broad range of these chemicals for resin use, including:

**Octylene Oxide**
**Dodecene Oxide**
**C16-C18 Olefin Oxide**
**Limonene Monoxide**
**Alpha-Pinene Oxide**
**Limonene Dioxide**
**Dicyclopentadiene Dioxide**

Among the areas where these epoxides contribute significant advantages are:

### REACTIVE DILUENTS AND MODIFIERS FOR EPOXY RESINS

Olefin oxides such as **Octylene oxide** are efficient viscosity reducing agents, entering into the curing reaction and becoming an integral part of the final resin. Auxiliary benefits are improved low temperature flexibility, prolonged pot life for polyamine curing systems, and moderated exotherm. **Limonene dioxide** can be similarly applied as a reactive diluent. As a bifunctional diepoxide it contributes viscosity reduction with minimum effect on end physical properties, such as heat distortion point. These diluents can be used in casting applications particularly at high solid loadings, and in preparation of laminates where efficient wetting necessitates a low viscosity material. They also have application as reactive solvents for 100% active coating systems and adhesives.

### HIGH TEMPERATURE RESINS

**Dicyclopentadiene dioxide** gives extremely high heat distortion point resins on curing with anhydrides in the presence of glycols. Although **Dicyclopentadiene dioxide** is itself a high melting solid the curing formulations are liquid and have good pot life.

### POLYOLS FOR POLYURETHANE RESINS

**Octylene oxide** and related olefin oxides can be homo-polymerized or copolymerized to give unique polyols for polyurethane manufacture. Use of small amounts of **Octylene oxide** for preparation of a propylene oxide polyol breaks up the crystalinity of the polymer and contributes to improved flexibility. The alkyl side chains contribute to improved solubility of polyurethane coatings. The high carbon-hydrogen to oxygen ratio is of interest for solid propellants based upon polyurethanes.

### CROSSLINKING AGENTS

Diepoxides such as **Dicyclopentadiene dioxide** and **Limonene dioxide** find use as crosslinking agents for polymers containing active hydrogen functional groups, e.g. carboxy, amino. Thus, vinyl and acrylic polymers containing carboxy groups may be insolublized and crosslinked after being laid down with a dioxide curing system. Curable liquid resins with active functional groups may similarly be crosslinked as in casting applications.

### FOR PREPARATION OF ALKYDS AND POLYESTERS

A mono-oxide may be considered as a diol and a diepoxide as a tetrol for the preparation of modified alkyds and polyesters.

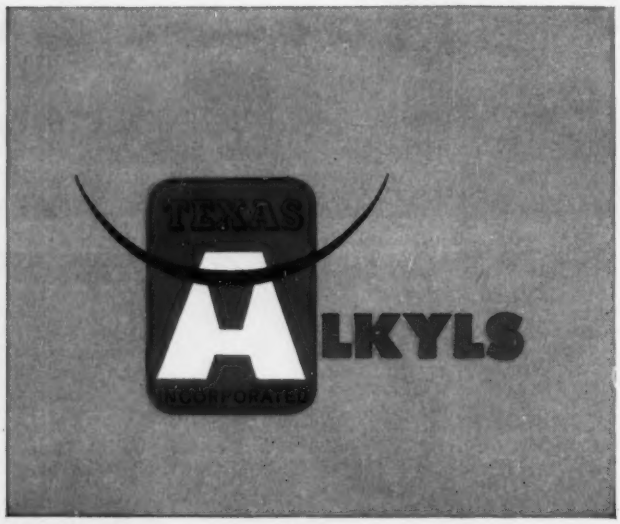
### STABILIZATION OF CHLORINATED RESINS

Epoxides are excellent stabilizers for chlorinated polymers as polyvinyl chloride, chlorinated rubbers, etc.

*Putting Ideas to Work*

**FOOD MACHINERY AND CHEMICAL CORPORATION**
**Chemicals and Plastics Division**
161 EAST 42ND STREET, NEW YORK 17, N. Y.

Pyrophoric Fuels!




# FIRST COMMERCIAL PRODUCER OF ALUMINUM ALKYLS

Texas Alkyls will be on stream in October with the world's largest capacity for the production of Aluminum Alkyls.

These new and highly reactive catalysts and intermediates are attractively priced. They can now be used in many commercial applications.

Primary products are TIBAL (Triisobutyl Aluminum) and TEAL (Triethyl Aluminum). Other products will be Ethyl Aluminum Sesquichloride and Alkyl Aluminum Chlorides and Hydrides.

Suggested uses: As polyolefin catalysts; as pyrophoric fuels; in the manufacture of straight-chain alcohols and alpha olefins and in the gas plating of aluminum.

Developmental quantities of TIBAL and TEAL are now available from existing semi-commercial facilities.

New Technical Bulletins on TIBAL and TEAL are available from . . .

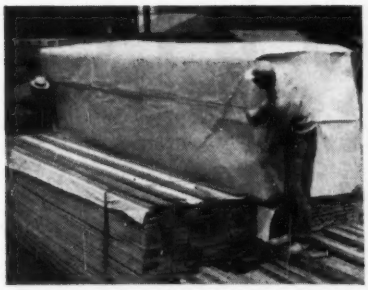
**STAUFFER CHEMICAL COMPANY**

*Anderson Chemical Company Division*

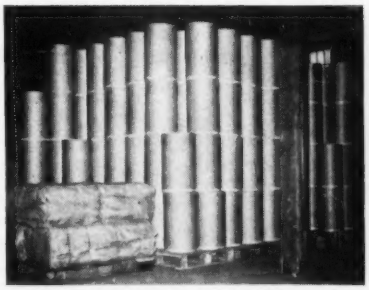
NEW YORK 17, 380 MADISON AVENUE • CHICAGO 1, PRUDENTIAL PLAZA
WESTON, MICHIGAN

*Exclusive Sales Agent for Texas Alkyls, Inc.*

## Bemis flexible packaging may solve your problem



**PAPER "SHED,"** weather-tough and re-usable, provides economical outdoor protective storage for bagged chemicals, building materials, etc. Often eliminates permanent storage shed at a big saving. Bemis-made of laminated paper, asphalt, and glass fiber.



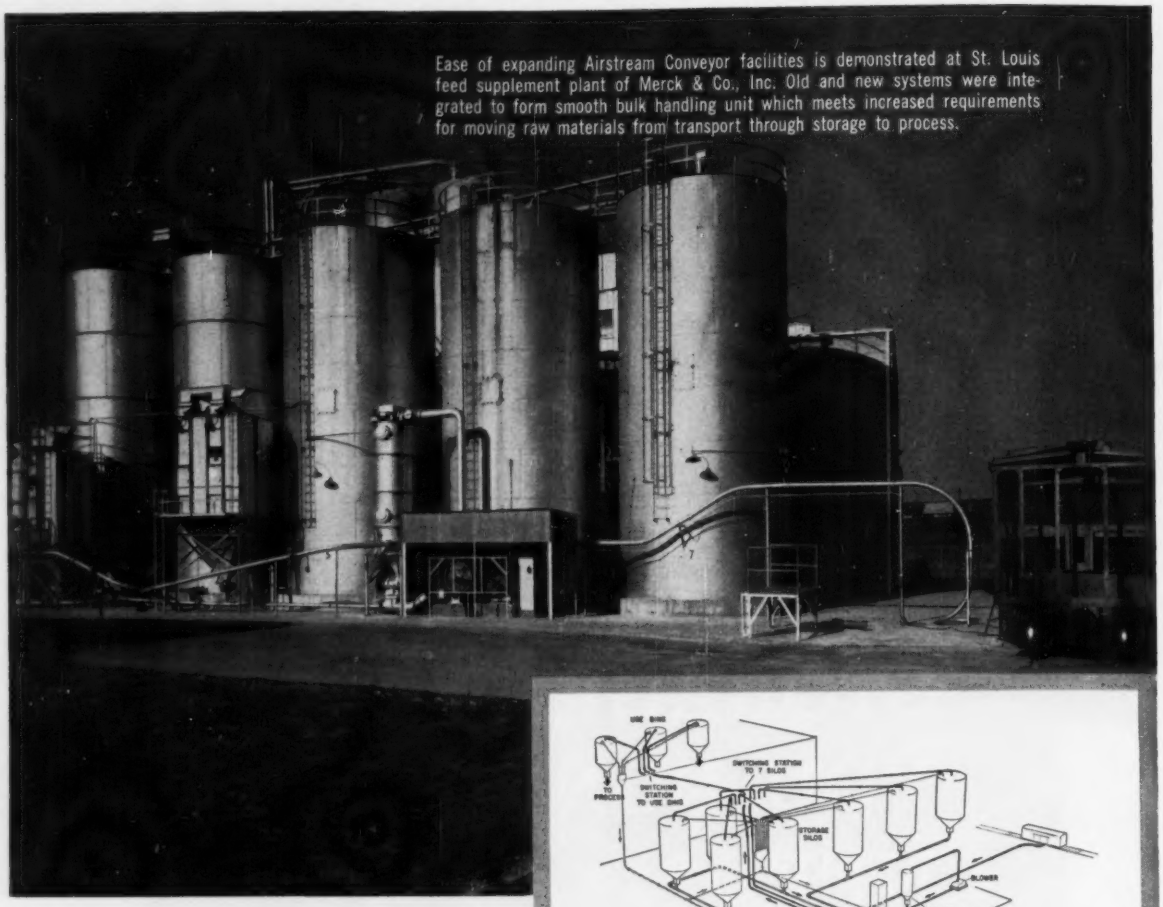
**BEMIS BEATS THE DRUMS!** A maker of dry yeast found he could store 1,000 empty Bemis Waterproof (laminated) Bags in only 2.3 percent of the space 1,000 drums used to take. So he gains 97.7 percent of his valuable storage space for other uses.

**ROLL UP SAVINGS** with Bemis polyethylene liners put up on compact rolls. Perforated to separate easily as the hand towels in your kitchen, roll put-up liners are easier to store and handle than individual liners . . . increase production while cutting costs.

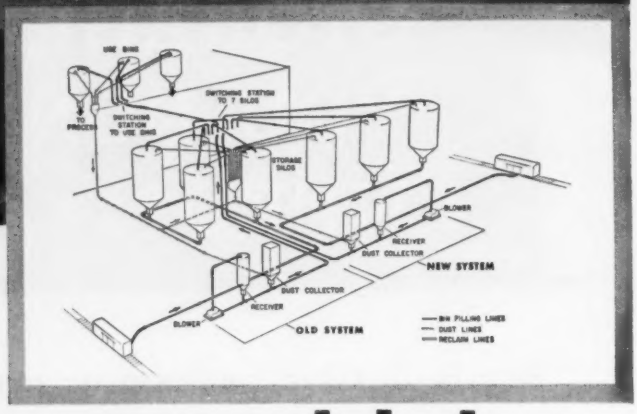
**Bemis may already be making the better package you need.**
**Write: Product Development, 408-J Pine St., St. Louis 2, Missouri**

**Bemis**

**Where flexible packaging ideas are born**



Ease of expanding Airstream Conveyor facilities is demonstrated at St. Louis feed supplement plant of Merck & Co., Inc. Old and new systems were integrated to form smooth bulk handling unit which meets increased requirements for moving raw materials from transport through storage to process.




**AIRSTREAM CONVEYORS ARE...**

# easily expansible

*If you plan to grow,* here's a thrifty way to avoid future bulk handling problems: install a Dracco Airstream Conveyor System to meet *current* needs, expand it when and as required.

You can easily tie a new system in with the original installation. New storage facilities can be built where you want them, without regard to location of existing receiving areas. Airstream conveying lines carry your dry bulk material to its destination via the quickest route—horizontally, vertically, through walls and floors, underground or overhead. They fit any plant layout, new or old, and save you valuable space. Ground level or rooftop installation eliminates costly supporting structures.

Merck & Co. recently took advantage of these features when they expanded their ground level Airstream System. In addition, use of duplicate components in the new system cut engineering costs. This also simplifies maintenance and permits minimum parts inventory.

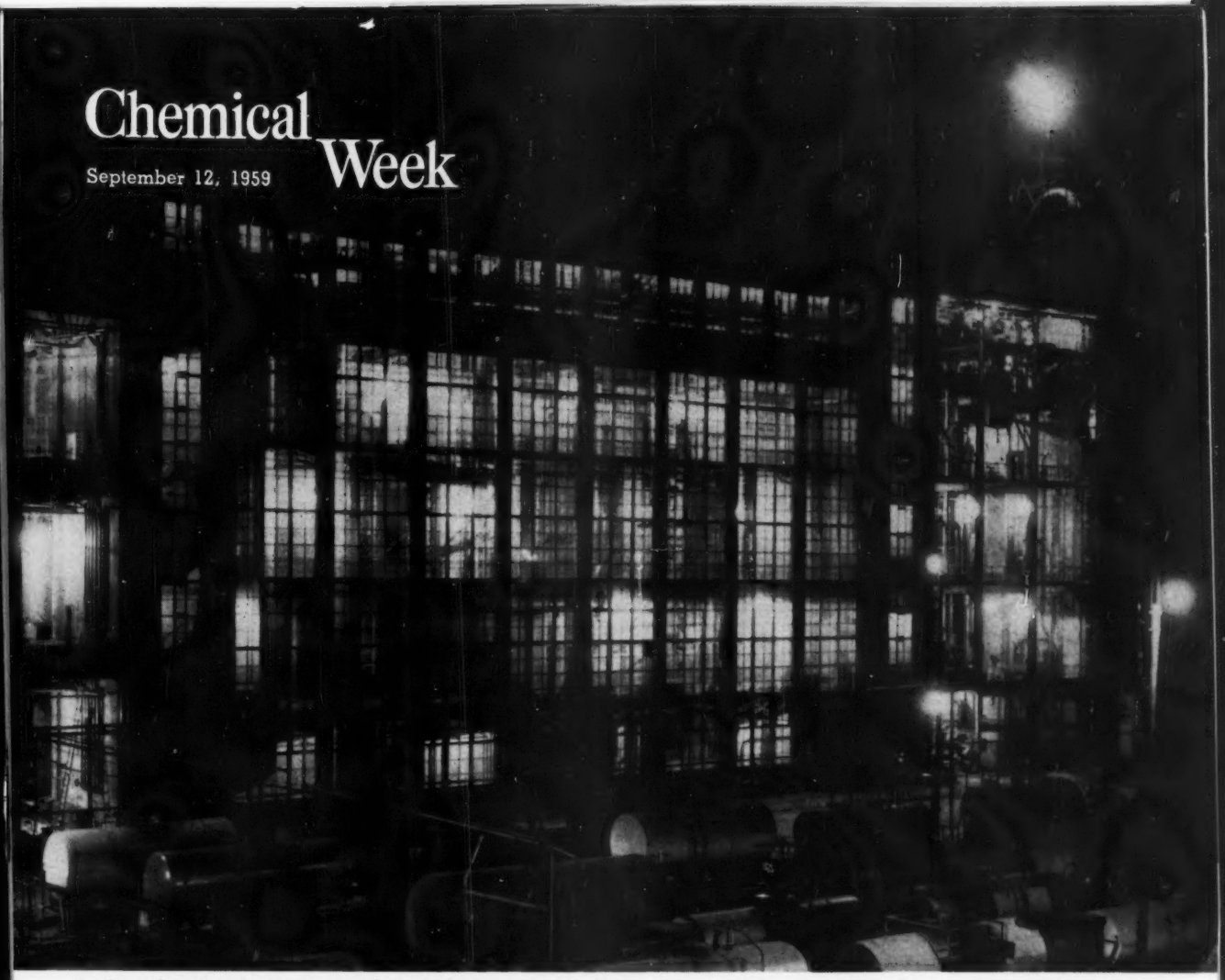
Benefits like these tell you why it's smart to install a bulk handling system that is engineered to help you move ahead. Call or write Dracco now for detailed information.

**DRACCO** DIVISION OF FULLER CO.
**4080 East 116th Street • Cleveland 5, Ohio**

**DRACCO** *airstream* conveyors
dust control equipment

(Pronounced Dray'co)

Chemical Week
September 12, 1959



**Farbwerke Hoechst solvent plant helps pour out rising tide of European chemicals in world markets.**

# New Spurt for Europe's Buildup

**ITEM:** ***In Jan. '63, oil from Mideast and Africa is slated to start flowing through a new pipeline that will run from Levera, on the Mediterranean, through France and across the Rhine River to Karlsruhe, West Germany. The pipeline will feed four new refineries—two in France, two in Germany—and new petrochemical plants.***

**ITEM:** ***At Grenoble, France, plans are under way for a plant to make isocyanates, polyesters and polyethers. It will be a joint venture of two French companies—Ugine and Progil, and Farbenfabriken Bayer.***

**ITEM:** ***During the past six months or so, the international listing of chemical stocks has become a trend. The three big Farben splinters—Bayer, BASF and Hoechst—were among the first German firms to show up on the Paris Bourse. Montecatini was among the first foreign shares to go on sale officially in Germany. (Imperial Chemical Industries is traded unofficially). And Pechiney stock bowed in on the Frankfurt exchange.***

Behind these separate developments is a single story—the growth and growing interrelationship of the European chemical industry. It's a story that has bone-deep significance for U.S. chemical producers.

More and more, the names of Europe's major chemical producers (*table, p. 38*) mean stiffer competition—in important "third markets" like South America, on their home ground in Europe, and even in the U.S.

In world markets, the revitalized European chemical industry is slowly eroding U.S. sales gains. In South America—largest market for U.S. chemical exports—European (and Canadian) producers accounted for 36.9% of all chemical imports in 1956, about 41% last year; U.S. sales share registered corresponding losses (*CW, March 7, p. 44*).

In '57, while U.S. chemical exports inched

## SIZING UP YOUR EUROPEAN COMPETITORS*

| Company | Headquarters | Assets | Total Sales | Export Sales | Profits | Employees |
|---|---|---|---|---|---|---|
| | | (Dollar figures in millions) | | | | |
| Imperial Chemical Industries | London | $1,732 | $1,295.5 | $206.6 | $66.6 | 112,108[1] |
| Farbenfabriken Bayer | Leverkusen | 528 | 478.6 | 200.4 | 22 | 52,538 |
| Badische Anilin- & Soda-Fabrik | Ludwigshafen | 458 | 460 | 171 | 20.8 | 41,135 |
| Farbwerke Hoechst | Frankfurt/-Main | 452.2 | 450 | 139.5 | 15.4 | 43,438 |
| Montecatini | Milan | 688 | 431.5[2] | 68.9[2] | 19.5[2] | 45,557 |
| Ciba | Basle | 119.2 | 212.9[3] | n.a. | 5.7 | 20,358[3] |
| Saint-Gobain[4] | Paris | 223.9 | 160 | n.a. | 4.8 | 20,000 |
| Rhone-Poulenc[5] | Paris | n.a. | 147 | n.a. | 6.0 | 14,500 |
| Pechiney | Paris | 235.2 | 144 | 33.4 | 5.2 | 9,150 |
| Chemische Werke Huels | Marl | 128.5 | 138 | 47.2 | 4.0 | 14,438 |

* Does not include some major companies (e.g., Shell Chemical Co. Ltd.) that do not report financial data; or companies (e.g., Societa Edison, Ugine and Bergwerksgesellschaft Hibernia) that operate primarily in industries other than chemical. n.a.—not available. 1. In United Kingdom only. 2. Includes significant unconsolidated subsidiaries and 50%-owned firms. 3. Includes Ciba group affiliates and intragroup sales. 4. Includes only parent company and wholly owned affiliates, domestic and foreign. Sales breakdown: glass, 54%; chemicals, 46%. 5. Includes parent company and affiliates Specia and Prolabo. Exports account for 25% of parent company's sales.

up about 1%, European producers boosted overseas sales by 13%.

**Production Surge:** Spurring the European export surge is a soaring output curve. Between 1953 and '57, chemical output rose 50%—an average of about 11%/year. And production growth is expected to continue at that rate for the next few years at least. U.S. producers, by contrast, increased output during the same period by about 6%/year.

Over-all, sales to non-European markets accounted for about 12% of total European chemical production in '57. And for many major European producers, exports are becoming even more important.

For Bayer, total exports rose from 31% of sales in '52 to 43% in the first quarter of '59. Last year, they totaled $200.4 million—42% of total sales. Sales to overseas nations rose faster than exports to other "Common Market" countries; the former accounted for 20% of total exports.

BASF's exports accounted for 37% of sales, or $171 million. Of this, 44.4%—or 17% of total sales—went overseas.

By stepping up sales to North, Central and South America and the Far East, Farbwerke Hoechst increased export sales by $4 million (to $139.5 million), 31% of total sales. Hoechst's export breakdown: 74% to other Common Market countries; 82% to countries within the projected Free Trade Area; 18% to overseas markets.

From France, Pechiney last year shipped some $13.6 million in chemicals to the U.S., Great Britain, Germany, and Spain. That's about 21% of the company's total chemical sales. Aluminum exports totaled another $19.8 million. For the first half of '59, Pechiney's chemical and electrometal exports totaled $9.4 million, compared with $5.6 million in the same period of '58. Total sales were $30.5 million, up from $25.8 million a year earlier.

Imperial Chemical Industries' exports account for about 15% of total sales. Last year, they rose only by about 1%, far less than the rise scored by most of the big companies on the Continent. But ICI's sales to Europe climbed 16%, to $65.5 million, and also gained in the Australian area, offsetting slips in India, Africa, and South America. (India is still ICI's largest foreign customer.) And ICI also operates manufacturing plants in those regions.

**More to Come:** The surest sign that European producers will be stepping up exports even more in the years ahead—as well as increasing their independence of imports from the U.S.—is their mounting investments in new plant and equipment.

Between 1958 and '60, some $650 million is expected to be invested in the European petrochemical industry alone, and by '61 total European petrochemical investment is expected to reach about $1.6 billion. This year alone, Europe's petrochemical output is expected to increase 50%.

Between this year and '61, West Germany will swell its present petrochemical investments by $250 million; France, by $225 million—making both countries virtually self-sufficient in this field. Italy expects new petrochemical investments to total $200 million; the U.K., $150 million.

**Capital Outlays Leveling:** Here's how the investment picture looks for some of the major producers. BASF spent $287.6 million during the past five years (an average of about $57.5 million/year), expects to spend $59.5 million/year this year and in '60.

Hoechst spent an average of $52.3 million/year during the past five years (a total of $261.5 million), expects

this year's investments to exceed $47.6 million.

Bayer plowed some $312.4 million into new plants over the past five years ($62.5 million/year average).

ICI plans to spend $139.4 million this year.

The big French companies are rarely eager to reveal vital statistics, don't publicly predict their '59 outlays. But last year, Pechiney spent $22.8 million, compared with $14 million in '57. Rhone-Poulenc (excluding its affiliates) spent $7.81 million last year. And Saint-Gobain spent $16.7 million.

**No Immediate Threat:** Increasing European chemical capacity doesn't necessarily mean that U.S. producers face a tide of European chemicals sweeping over their home shores, or that they will be washed out of their overseas markets. U.S. chemicals are still highly competitive. In productivity, European chemical producers have a long way to go to catch up with their U.S. competitors. Man-hour labor costs are lower in Europe, but labor/pound costs are higher (*CW, July 25, p. 66*).

And, on the surface, at least, profit margins of European producers seem to allow a lot less leeway for price-cutting than U.S. producers enjoy. In the U.S. last year, producers of chemicals and allied products managed to earn profit margins averaging almost 7%, despite the effects of the recession. But in Europe, modern-minded ICI showed only a 5.1% margin. Bayer's was 4.6%, Hoechst's, 3.4%; Montecatini's, 4.5%; Ciba's, 2.7%.

These figures, it is true, are not strictly comparable. Accounting methods vary not only from country to country, but from company to company. Still, the fact that the European margins are consistently below the U.S. average is significant.

**Moves to Modernize:** But U.S. producers can expect their competitive edge to narrow in the coming years. The new capacity that will be coming onstream will be the same kind of modern, efficient equipment that produces U.S. chemicals.

More important is the trend toward "rationalization" ("modernization" in the U.S.).

The trend in Germany is typical. In the reconstruction years right after World War II, investment emphasis was on building up capacity. But as Germany got back on its feet and regained prosperity, the emphasis shifted. Full employment helped spur demands for wage increases and shorter working hours, and producers began turning their attention toward increasing productivity.

By '57, German industry men estimate, they were spending about as much on modernization as on expansion. While over-all investment remains at about the same level, construction outlays are estimated to have dropped to about $90 million in '57, about $5-10 million in '58, and will be cut slightly this year. Petrochemicals, in fact, is the only field in which major capacity expansions are expected.

Along with these trends in Europe's booming chemical industry, two other major developments will affect U.S. producers' competitive position: the gradual erection of the Common Market preferential tariff system, and next year's GATT negotiations, which may well result in some lower U.S. tariffs on chemicals from Europe.

## Five in Polypropylene

**Competitive pressure in polypropylene increased very notably last week: a fifth contender entered officially, and AviSun joined Hercules as active producers of the plastic.**

Here are details on the latest developments in the race to cash in on this cheap, tough, versatile petrochemical plastic:

Dow Chemical will build a polypropylene facility at a still-undecided West Coast site and at the same time is gearing for early '60 production of polypropylene samplings at its just-completed plant at Bay City, Mich. Up to now, this unit had been called a linear polyethylene plant; now, more broadly, it's a polyolefin plant.

Hercules Powder Co. (Wilmington, Del.) is "considering" an additional new polypropylene facility. But first, it will increase capacity at its Parlin, N.J., plant from 20 million to 50 million lbs./year early next year.

AviSun—a joint venture of American Viscose Corp. and Sun Oil—has begun startup runs of polypropylene at its leased Port Reading, N.J., plant, and says renovation of its facilities at New Castle, Del., will soon be completed.

An Esso pilot plant is putting out about 2,000 lbs./day for the Humble-Enjay-Spencer venture while the 40-million-lbs./year plant at Baytown is being hurried toward completion.

**Two-Plant Plan:** Dow—one of the dark horses in polypropylene until last week—says its polypropylene production at Bay City will be "modest" but that the projected West Coast plant will be large enough to "supply West Coast requirements."

Hercules, which jumped into polypropylene production nearly two years ago (*CW, Dec. 7, '57, p. 31*), still has the only plant in full operation in this country. But AviSun has now gone onstream at the New Jersey plant it leased from Koppers, and after production startup bugs are licked, the company is expected to produce up to 20 million lbs./year.

AviSun will make film, and later fiber, at its New Castle plant, beginning late this fall; Hercules, on the other hand, says it has no plans at present for producing anything but the resins.

**Onstream by February:** Humble—which is building the 40-million-lbs./-year plant at Baytown, Tex.—says it should be turning out polypropylene by mid-February. Humble (owned 99% by Standard Oil of New Jersey) will produce the material; Enjay (also a Jersey subsidiary) will sell it; and Spencer, under a four-year agreement, will aid Enjay in marketing it. Humble says its plant is "readily expandable to 100 million lbs./year" as demand picks up. And it likely will — its boosters predict it will equal polyethylene's spectacular growth record.

First sold at 65¢/lb., polypropylene is now 42¢, only 4-7¢ more than high-density polyethylene.

Getting a late production start in the U.S. is Italy's Montecatini, which has been selling Italian-made material here for two years. Its newly formed subsidiary, Novamont Corp., is awaiting completion of design for the 10-million-lbs./year polypropylene facility at Neal, W. Va. Groundbreaking is now scheduled for November.

No one is counting on a quick pay-out. Standard and Humble—which will have spent at least $30 million to get into production—hold that even after a stable product is developed, extensive technical service will be needed before a profitable market can be attained.

## Dixon 2-Company Plan

**Dixon Chemical & Research (Bloomfield, N.J.)—a growing force in heavy chemicals—is about to get a $1-million boost—to bolster its position as an aggressive supplier of inorganic chemicals in the Middle Atlantic states.**

This six-year-old firm—organized and headed by 39-year-old Arthur Dixon, Jr.—is offering through two New York underwriters 10,000 shares of 6% cumulative convertible preferred stock, $100 par value.

At present, DC&R and the affiliated Dixon Chemical Industries—also organized and headed by Dixon, and managed and 27% owned by DC&R—have two plants in operation. Both are sulfuric acid plants. One is DC&R's $2.5-million, 150,000-tons/-year, contact-process plant on a five-acre waterfront tract at Newark. The other is DCI's 42,000-tons/year plant on a 70-acre waterfront tract at Paulsboro, N.J.

With its Newark plant and with a sideline as distributor of heavy chemicals (such as muriatic acid and caustic soda) purchased from other producers, DC&R has built up an increasing business in the highly competitive New York area. First-half sales were up 63.9%, to more than $2.1 million, and net earnings were $203,681, compared with a $27,642 deficit in the first six months of '58.

**Two Plants Coming:** But within six months, two new plants are expected to be in operation:

- DC&R's $1.25-million, 40,000-tons/year aluminum sulfate plant, adjacent to the sulfuric plant at Newark. Old plant and new are to be run on a closely integrated basis; for example, the alum plant's sulfuric acid requirements—about 20,000 tons/year—will be piped in from the older, sulfuric acid plant.
- DCI's $6-million, 300,000-tons/-year sulfuric acid plant at Paulsboro. It will utilize waste acids from petroleum refineries in the Philadelphia area.

DC&R also has arranged for construction of a 3,000-ton storage-capacity sulfuric acid bulk terminal on deep water at Fall River, Mass.

**Geographical Assets:** Dixon figures that DCI's new plant will have formidable economic advantages. For one thing, much of the raw material will be "sludge" from nearby refineries.

There's also the matter of freight costs. Singmaster & Breyer—engineering firm retained by DCI on this project—estimated that, in '57, industrial plants within 30 miles of Paulsboro bought and used 650,000 tons of sulfuric, of which only 250,000 tons was produced in the area.

Apparently substantiating Dixon's calculations are two big contracts already landed by DCI. Tidewater Oil and Socony Mobil have agreed to buy up to 107,000 tons/year from the Paulsboro plant for at least five years—at prices below current market levels.

**Where Money Goes:** After this month's financing, DC&R will have these securities outstanding: 6% first-mortgage bonds, $1.9 million; 5½% secured bank note, $750,000; 6% cumulative convertible preferred stock, par $100, 10,000 shares; and $1-par common stock, 665,000 shares (17% held by DC&R officers and directors).

Only about a year ago, it seemed that Dixon was in trouble. Allied Chemical—for which Dixon had worked as a salesman before launching his own company early in '53—brought suit to block Dixon's expansion program. Allied charged that some of the plans were based on Allied trade secrets appropriated by three men who worked for Allied before being employed by Dixon. (They have since resigned from the Dixon organization.)

But Dixon and Allied worked out a consent decree that permits Dixon to proceed with his expansion program, provided that Allied technology is not used. In accordance with that decree, H. K. Ferguson Co. is constructing DC&R's alum plant on a turn-key basis; and DCI has retained Chemical Construction Co. and Singmaster & Breyer as turn-key contractor and independent engineer, respectively, on the spent-sulfuric acid plant.

So this hurdle has been cleared, and both projects are well under way. Temporarily, at least, DC&R has written off its former plan to build a hydrofluoric acid plant. But odds are that Dixon won't stop building when the two new plants are completed early next year. He assures his stockholders that DC&R "is presently investigating other possible enterprises in the chemical manufacturing field."

## Hooker's 5-Year Plan

**Hooker Chemical Corp. (Niagara Falls, N.Y.) is charting a five-year, $100-million growth program that could push sales volume to more than $200 million/year—without further growth by merger. This would mean doubling the '55 sales range by '65.**

To help finance this new expansion program, the company is offering $25 million worth of convertible debentures this week. They will be dated Sept. 15, will bear interest from Oct. 1, mature Sept. 15, '84.

Hooker says that much of the $100 million will go for expansion of chlorine, caustic soda, caustic potash, phenol and phosphorus facilities. But company officials add that substantial expenditures also will go into increased synthetic resin production, new chemicals and plastics, and for additional utility services and facilities.

Early this year, Hooker embarked on first stages of the '59-'63 program:

- New unit for production of phosphates directly from ferrophosphorus, with a new phosphoric acid plant at Jefferson, Ind., to be completed this year.
- Conversion of electrical equipment at Niagara Falls from 25 to 60 cycles (*CW, July 4, p. 40*).
- Complete revamping of the benzene hexachloride plant there.
- Three plant expansions already under way: the sodium chlorate plant at Columbus, Miss.; the adjacent ammonium perchlorate plant of HEF Inc. (owned 50-50 by Hooker and Foote Mineral Co.); and the phosphate plant at Columbus, Tenn.

The company currently spends about $4 million/year on direct research and development work, mainly at its Grand Island, N.Y., center.

Hooker also has been planning construction of a plant near Mexico City for production and marketing of phosphates in Mexico. The $1.1-million plant is scheduled for early-'60 completion and will be run either by the company alone or in conjunction with Mexican interests. And investigation into the feasibility of expansion into Latin America continues.

The debentures now being issued by underwriters Smith, Barney & Co. (New York) may be converted into common stock at any time on or before date of maturity.

## COMPANIES

**Freeport Nickel Co.,** subsidiary of Freeport Sulphur Co., is completing construction of its nickel-cobalt mining and ore concentrating facilities at Moa Bay, Cuba. And its refinery at Port Nickel, La., is now gearing for production. The first ore has been put through the slurry plant, and the Louisiana refinery is now awaiting the first shipment of nickel and cobalt sulfite concentrate. Indicated ore reserves in Cuba: 50 million tons; ore processed yearly, 2 million. Annual capacities at Freeport's Louisiana facility: 50 million lbs. of nickel metal, 4.4 million lbs. of cobalt metal, 90,000 tons of by-product ammonium sulfate.

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**Air Reduction Co.** (New York) is using the generic term vinal to identify its polyvinyl alcohol fiber known abroad as Vinylon. Under the Textile Fiber Products Identification Act, vinal is described as a synthetic fiber of at least 50% polyvinyl alcohol units and at least 85% total alcohol and acetal units. In Japan, the man-made fiber is used in a wide range of products, such as school uniforms, fishnets and paper.

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**Hy-Trous Co. of Canada** (Cornwall, Ont.) has been acquired by Fisons, Ltd. (England), and Albatros Superfosfaatfabrieken N.V. (Holland). A $150,000 modernization program has been set for the formerly family-owned fertilizer company, which has been renamed Hy-Trous Co. of Canada 1959, Ltd. The foreign companies already own International Fertilizers Ltd., with plants in Saint John, N.B., and Wolf's Cove, Que.

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**Amalgamated Chemical Co.** (Salt Lake City, Utah) has been formed. Total $100,000 capitalization has been subscribed. The firm holds about 50,000 acres in potash permits in southeastern Utah and southwestern Colorado, according to N. G. Morgan, Sr., president.

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**Food Machinery and Chemical Corp.'s** Chemicals and Plastics divisions (New York) have formed two new departments to make and market diallyl phthalate (Dapon) and epoxy resins. The Dapon department will be headed by Robert Malott, the epoxy department by Kenneth Wanderer.

## EXPANSION

**Paper:** Rayonier Inc. is considering expansion of its paper mill at Grays Harbor, Wash., in view of rising West Coast paper demand. Russell Erickson, president, said the company expects to remain a major supplier of cellulose to the Japanese rayon industry even following completion of the Japanese-sponsored cellulose mill in Alaska.

**Furfural:** Falcon Chemical Corp. (Lake Charles, La.) is set for initial production of furfural from rice hulls. The $300,000 unit will use a "new technique" for obtaining this intermediate, formerly produced in this country only by The Quaker Oats Co.

## FOREIGN

**Pharmaceuticals/Chile:** Schering Compania Limitada—subsidiary of Schering Corp. (Bloomfield, N.J.)—was scheduled to dedicate a $5-million pharmaceutical plant at Santiago this week. The plant includes four specially designed buildings with a total of 16,000 sq. ft. of floor space on a five-acre site near Los Cerillos Airport. It will employ nearly 100. First-year production capacity: $9 million worth of pharmaceuticals.

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**Fertilizer/Syria:** A $14-million nitrogen fertilizer plant is to be built by the Ministry of the Interior in the Syrian region of the United Arab Republic. It will be adjacent to the new Czech-built petroleum refinery at Homs. Soviet technicians had recommended a capacity of 40,000 tons/year of ammonium nitrate; but the government decided to accept the recommendation by Egyptian specialists that the plant be built to produce at least 100,000 tons/year.

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**Plastics/Germany:** A 21% increase in production of plastics materials for the first four months of '59 was reported by the West German Chemical Federation. Total output for that period: 244,000 tons, of which about 26% went into exports. Exports of plastics were up 23%, to $49.2 million; imports rose 25%, to $15.7 million. About 46% of the imported plastics materials came from the U.S.

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**Drug Trade/U.K., U.S.S.R.:** Medicines, drugs and pharmaceuticals — including raw materials — will be shipped in both directions if a new trade agreement between Britain and the Soviet Union is fulfilled. It provides for sale of up to $280,000 worth of such products to the U.S.S.R., and sets a quota for shipment of up to $896,000 worth of drug products to the United Kingdom.

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**Ferroalloys/Philippines:** Maria Cristina Chemical Industries (Manila) plans to start production of ferrosilicon, ferromanganese and silicomanganese this fall. This project—said to be the first of its kind in the Filipino Republic—is expected to save about $250,000/year in foreign exchange.

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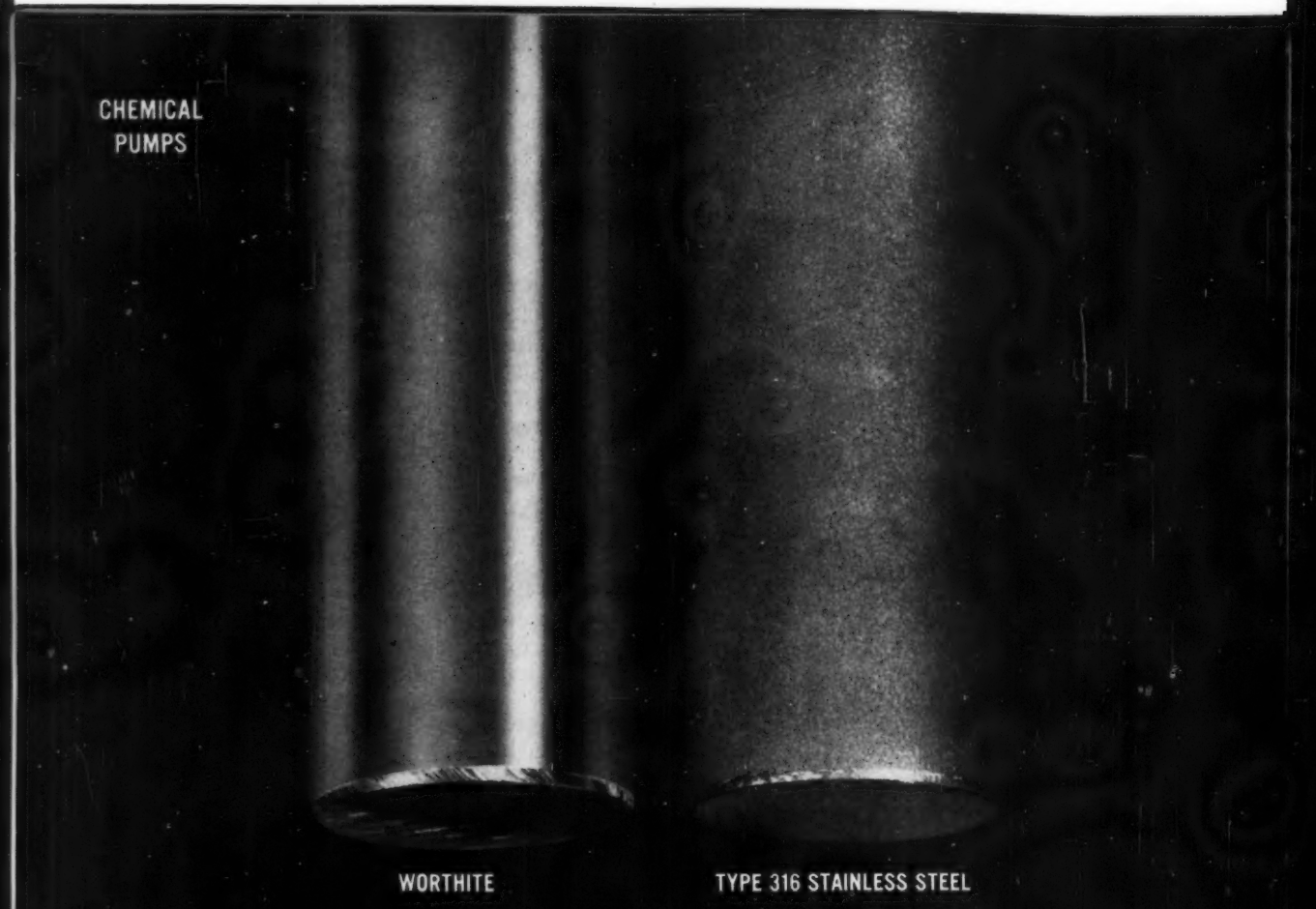
**Paper/Israel:** American Israeli Paper Mills (Hadera) increased sales 17.5%, to $32.8 million, and net income nearly 100%, to $3.7 million, in the year ended March 31. Production mounted by 18%, to 17,679 tons. New facilities—including Israel's first pulp mill—are to be in operation by the end of this year.




Here's proof of Worthite's superior corrosion resistance. Both bars were immersed for 56 hours in 40% sulfuric acid solution at 125° F.

# ARE YOU WILLING TO SPEND A FEW PENNIES MORE FOR THIS KIND OF PUMP PROTECTION?

Worthite* has become the standard pump material of the chemical industry for one simple reason: it gives a whale of a lot more corrosion protection for a premium of just a few percent.

This can mean major savings in plant operations. By standardizing on Worthite, you get flexibility to make changes in the process without running up against more corrosive liquids than your pumps can handle.

Here's how Worthite compares with Type 316 stainless steel, a very acceptable corrosion resistant material:

| | WORTHITE | TYPE 316 STAINLESS |
|---|---|---|
| Chromium | 20% | 18% |
| Nickel | 24% | 14% |
| Molybdenum | 3% | 3½% |
| Silicon | 3¼% | 1% |

Worthite has almost twice as much alloying material, yet it costs but a few pennies more.

What's the reason for Worthite's low price? By standardizing on this one alloy and by quantity buying and production, Worthington has made its price competitive with ordinary stainless steel.

Isn't it time for you to investigate the advantages of Worthite as a standard? Get in touch with your nearest Worthington representative or see Worthington's insert in Chemical Engineering Catalog. Or write to Worthington Corporation, Section 20-7, Harrison, N. J. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

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# Washington
## Newsletter

CHEMICAL WEEK
**September 12, 1959**

**The new labor law strictly limits union officials' power** over union members. Where the Wagner Act protected the union's right to organize, and the Taft-Hartley Act helped the employer in dealing with the union, the '59 law now cleared by Congress helps protect both sides against union officials.

One provision has specific meaning for the chemical industry. The reform law deletes the non-Communist oath now in the Taft-Hartley Act, which officials of the United Mine Workers and its affiliate, District 50, had refused to sign. As a result these unions could not use the services of the National Labor Relations Board nor appear on its election ballots.

Elimination of the oath means that District 50 locals in the chemical industry may now invade the territory of AFL-CIO chemical unions more directly. They will be able to challenge rival unions to representation rights and take their place alongside those other unions on the ballot.

The law has little effect on big unions in big industries. But it hits hard at the smaller industries — trucking, construction, retailing, small manufacturing plants. In the chemical industry, the small, unorganized plants will be most directly affected. Employers can no longer be forced to sign union contracts unless a majority of the workers want it, and organizational picketing is generally outlawed.

**Other major effects of the law:**

• State agencies and courts can step into the "no man's land" of labor disputes the National Labor Relations Board does not handle. Unions have asserted that state agencies are more antilabor than federal.

• A bill of rights for union members protects their efforts to oppose union leaders in meetings or by secret ballot.

• Secondary boycotts, where an organized employer is forced to prevent his workers from handling nonunion goods, are banned. This strikes at the teamsters particularly.

Employers as well as unions will be required to file annual reports. Employers must record all loans or payments to union members that might affect their organizing-bargaining efforts and payments to labor relations consultants. Unions must make more extensive reports, including loans to businesses and anything that might smack of conflict of interest.

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**The air pollution control program will be extended** by different bills passed by the House and Senate on which conferees are meeting. The House bill simply extends the program another two years; the Senate measure increases annual funds from $5 million to $7.5 million and extends it four years.

The program involves research on effects of pollution, a national air sampling network, and federal studies and reports on local situations. Important information has already been developed on the health effects of such pollutants as sulfur dioxide and olefin compounds.

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**CPI industries along the Niagara and St. Lawrence Seaway** complex are watching the fight over taking water from Lake Michigan to help Chicago's sewage system. The Senate has pigeonholed the water diversion bill for this session largely because of international implications, but it is bound to come up again next year.

The power plants which have attracted CPI industries to that area depend upon full water flow. And the Canadians are in a position to—and may—retaliate if the U.S. starts diverting water. The Canadians now contribute water from the deep rock mining project north of Lake Superior by diverting it from the Hudson Bay to the Great Lakes. They have stated that if the U.S. acts unilaterally they might have to consider claiming all the deep rock water flow for their own power plants.

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**Hearings on pollution of the lower Columbia River** below Bonneville Dam by pulp and paper industries and other plants are currently being held at Portland, Ore. In the first session, a year ago, conferees agreed that a potential health hazard exists. This time they hope to come up with a time schedule for correcting the problem.

The request of Electro Chemical Laboratories to dump radioactive wastes in underground vaults in Oklahoma and Kansas will be heard by the Atomic Energy Commission, Oct. 21. The hearing will be an appeal by the company against AEC's notice that it intends to deny a license for such disposal.

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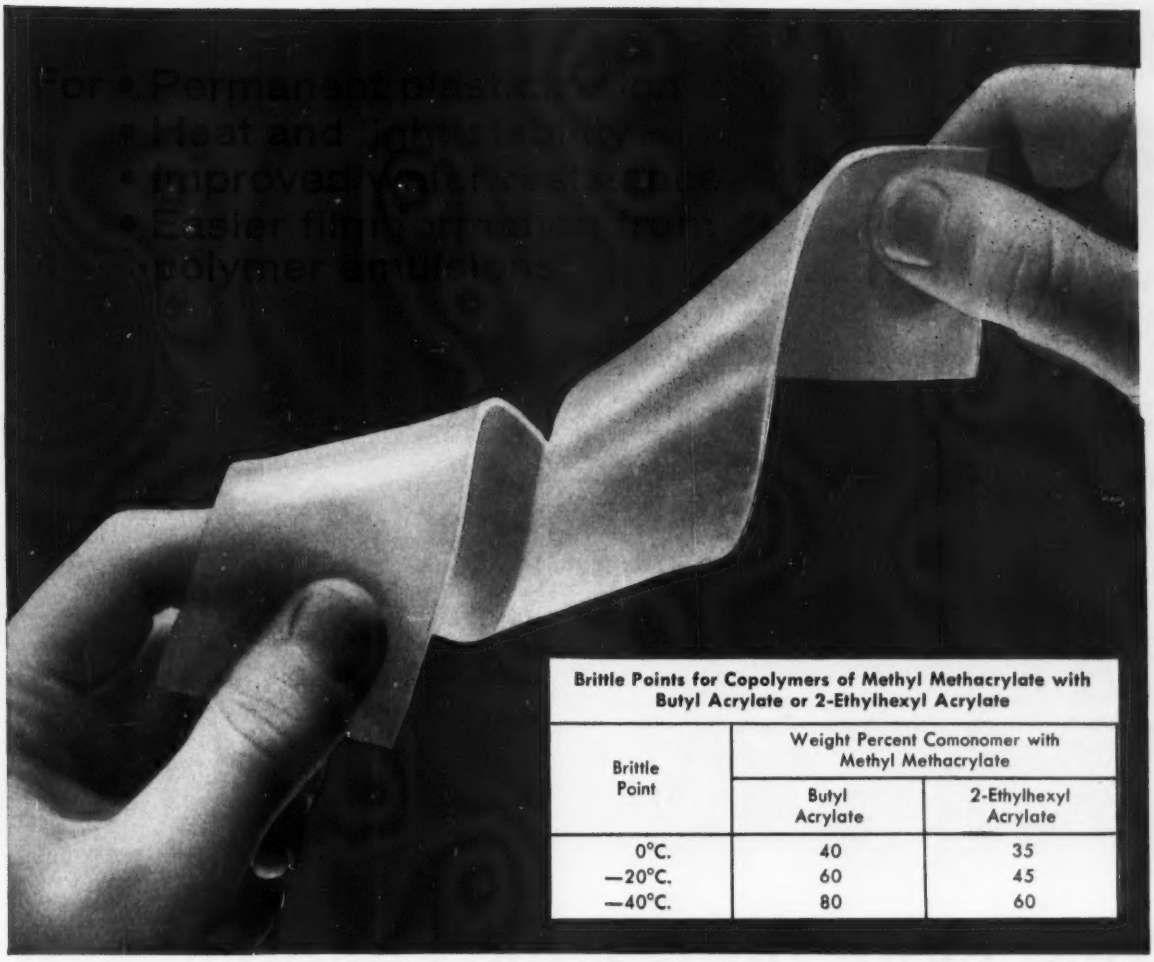
**Twenty national Medal of Science awards** will be presented yearly under a new law approved by the President. Awards, based on recommendations from the National Academy of Science, will honor achievement in the physical, biological, mathematical and engineering sciences. They are designed to provide incentive and prestige for scientific accomplishment.

National Science Foundation is sharply criticized for dragging its feet on development of a scientific manpower register and clearinghouse. The criticism comes from the House space committee, which says NSF has been overly cautious and should move ahead "even at the risk of some mistakes." It points out that less than 1% of the NSF budget is devoted to manpower problems although the agency's 1950 charter specifically charged it with developing a register and clearinghouse.

NSF has made the beginnings of a register to be used in a national emergency by collecting some information on IBM cards from the various science societies.



**Brittle Points for Copolymers of Methyl Methacrylate with Butyl Acrylate or 2-Ethylhexyl Acrylate**

| Brittle Point | Weight Percent Comonomer with Methyl Methacrylate | |
|---|---|---|
| | Butyl Acrylate | 2-Ethylhexyl Acrylate |
| 0°C. | 40 | 35 |
| —20°C. | 60 | 45 |
| —40°C. | 80 | 60 |

# copolymerize with BUTYL ACRYLATE or 2-ETHYLHEXYL ACRYLATE

Would you like to give your polymer enduring flexibility and at the same time improve its heat and light stability and water resistance? Copolymerize your monomer—be it styrene, vinyl chloride, methyl methacrylate, or one of many others—with butyl acrylate or 2-ethylhexyl acrylate. The table above shows how either butyl acrylate or 2-ethylhexyl acrylate can lower the brittle point of a copolymer and build lasting plasticization right into the polymer chain. The acrylic plasticizing agent doesn't volatilize or migrate, nor can it be extracted by solvents. In addition, the added acrylic links in your copolymer confer better resistance to water and to deterioration by heat and light. Furthermore, these copolymers can be processed at lower temperatures, and they form films more readily at low temperatures because of improved flow properties.

Copolymers made with butyl acrylate or 2-ethylhexyl acrylate are useful in producing emulsion and solution coatings, textile finishes, packaging films, paper coatings, leather finishes, adhesives, and elastomers. Write to Dept. SP-28 for literature on butyl acrylate, 2-ethylhexyl acrylate and other acrylic monomers.

*Chemicals for Industry*

**ROHM & HAAS COMPANY**

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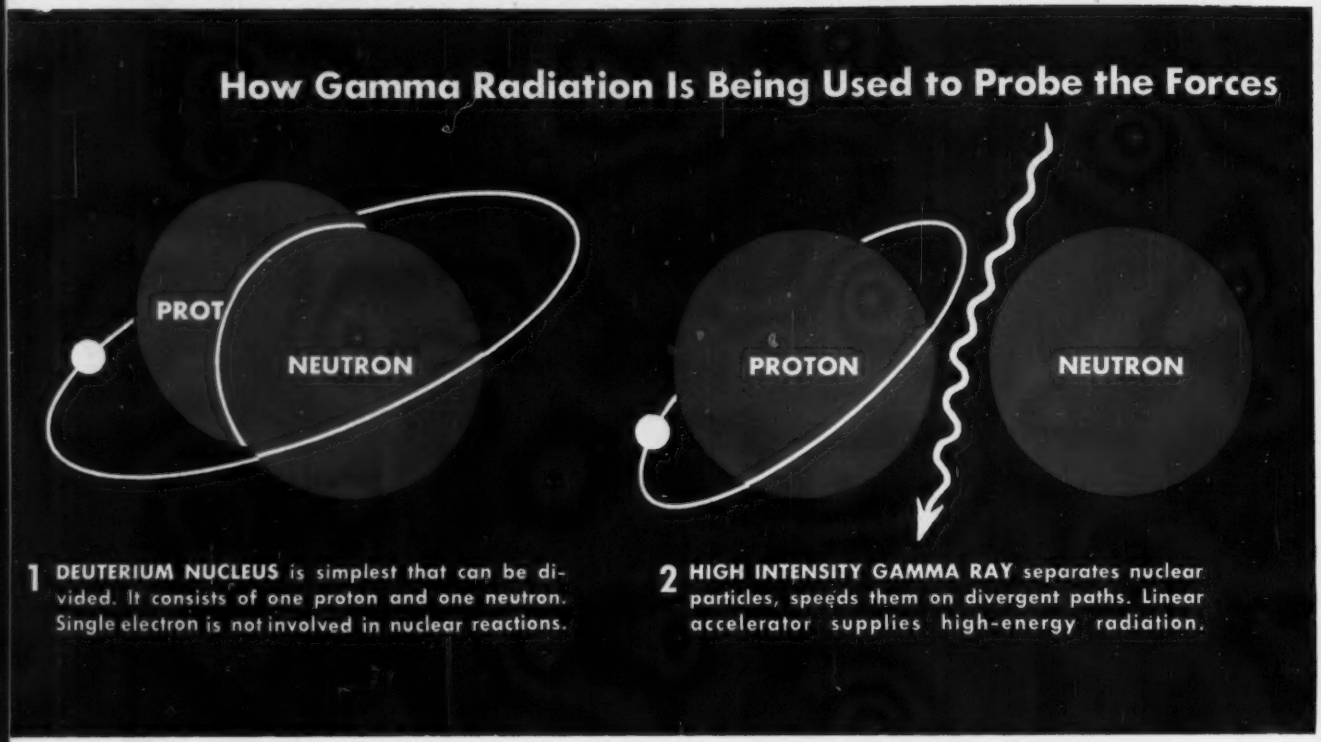

How Gamma Radiation Is Being Used to Probe the Forces
PROT
NEUTRON
PROTON
NEUTRON
1 DEUTERIUM NUCLEUS is simplest that can be divided. It consists of one proton and one neutron. Single electron is not involved in nuclear reactions.
2 HIGH INTENSITY GAMMA RAY separates nuclear particles, speeds them on divergent paths. Linear accelerator supplies high-energy radiation.

# New Light on Nuclei: Fundamental

**A lot more basic information of the kind developed at last week's first Gordon Research Conference on photonuclear reactions will be required before radiation achieves a firm foothold in chemical processing. But these fundamental studies—which concern the interaction of gamma rays and electrons with atomic nuclei—are already showing useful results.**

The meeting, held at Kimball Union Academy, Meriden, N.H., attracted 103 conferees from 11 countries including the U.S. and Canada.

According to conference co-chairman Peter Axel, of the University of Illinois (Champaign) physics research laboratory, nuclear exploration is already turning up benefits for medical, chemical, and other researchers, too.

Axel explains that both fusion and fission researchers can use information gained by photonuclear research. For example, such studies are helping explain how uranium "breaks up" in the reactor, a process that is sometimes nonuniform and is not clearly understood.

Other photonuclear research by-products include unusual radioactive isotopes, which are made available to investigators in other fields, such as medicine and biology. And it's of help to other researchers using high-energy radiation in studies of chemical processing, food sterilization, and cancer therapy.

Although nuclear probers are primarily bombarding nuclei of a wide variety of materials, they inadvertently hit outer atomic shells, too. The results can be interesting to other investigators. For example, recent studies involving bombardment of thin foil polyethylene resulted in unexpected radiation absorption, which was attributed to the formation of methane.

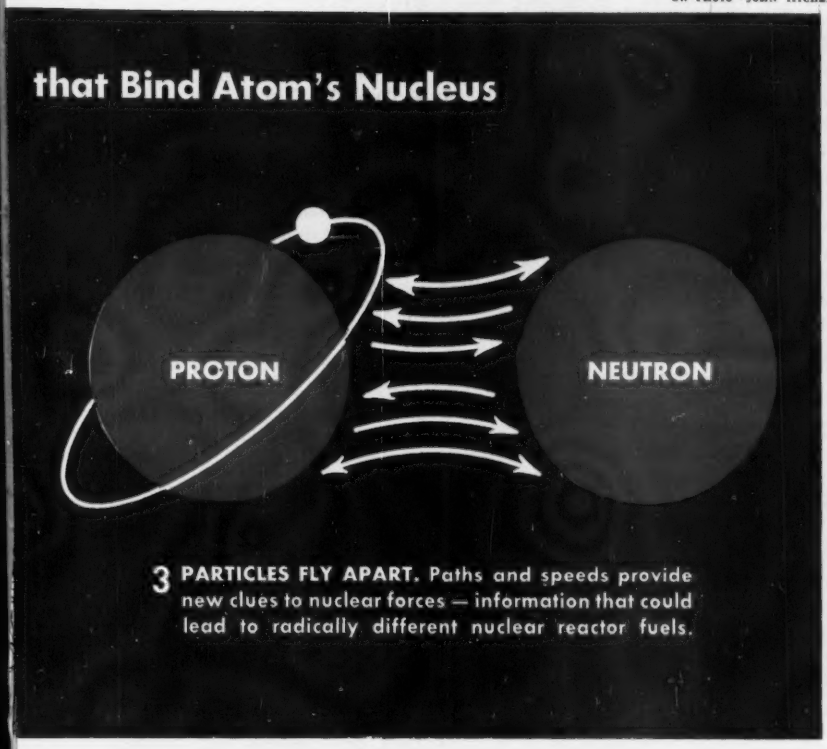
High-radiation-level machines (e.g., linear accelerators) and refined instrumentation developed for nuclear probing are sometimes used in industrial research. This may be in probing radiation-induced chemical reactions or even in X-raying steel for flaws. Finally, nuclear probes have turned up useful analytical techniques. One of these is for determining oxygen in beryllium. Bombarding oxygen-16 with gamma rays yields oxygen-15 and neutrons, which can be counted with Geiger or scintillation instruments.

Other possible benefits that may come from photonuclear research include development of a reactor fuel cheaper than uranium (possibly iron) and improved reactor and space missile materials.

**Strictly Fundamental:** Photonuclear researchers

Gamma-ray wielder Peter Axel, University of Illinois, spearheads photonuclear research.

CW PHOTO—JOHN TITCHEN


that Bind Atom's Nucleus
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3 PARTICLES FLY APART. Paths and speeds provide new clues to nuclear forces — information that could lead to radically different nuclear reactor fuels.

# Probes Help Fathom Atom's Future

aren't concerned with empirically exposing chemicals to radiation, observing what (e.g., cross-linking, polymerization) develops. Much of this has been going on in industrial labs, they aver, with only casual success. Besides, such reactions concern the outer electron shells of atoms and relative distances from the atomic nucleus comparable to those of the earth from the sun.

Nor is their work to be confused with fusion research, in which the work is with plasma, a mixture of a variety of particles at extremely high temperatures. And conventional fission research is more of an applied field, dealing with improved reactors and fuels.

Although photonuclear reactions have been observed for about 25 years, there is still no comprehensive theory of how nuclear particles are held together and why certain nuclei are more stable than others. So the new research, in the opinion of the meeting's co-chairman, University of Illinois physicist A. O. Hanson, is directed at trying to make the nuclear science as quantitative as possible.

In the U.S., most photonuclear research is done at universities or in government laboratories. The university work is often government supported. Represented at the Gordon Research Conference, besides the University of Illinois, were such geographically scattered institutions as the University of Pittsburgh, Stanford, Case Institute of Technology (Cleveland), Yale, MIT, Purdue, Princeton, The Rice Institute (Houston), the universities of Pennsylvania and Maryland, the U.S. Naval Research Lab (Washington, D.C.), the National Bureau of Standards, and Brookhaven National Laboratory (Upton, Long Island, N.Y.).

Equipment used also varies appreciably. For example, photonuclear researchers at Iowa State University of Science and Technology reported studies (on argon) using two General Electric 70-million-electron-volt types of electron synchrotrons. Centre d'Etudes Nucleaires (France) researchers are working with a 30-mev. linear accelerator. And three Van de Graaff generators are the mainstay of studies on neutrons and charged particles at the United Kingdom Atomic Energy Authority at Aldermaston, Reading, England.

Right now, any conjecture on the ultimate practical benefits to be derived from photonuclear research can't be supported with much laboratory evidence. But the increasing government, academic and industrial support of this kind of research is a sure sign of a great deal of confidence in its potential value.

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RESEARCH

## EXPANSION

• Union Carbide Nuclear Co. (New York) has contracted for the construction of a nuclear reactor building in Sterling Forest, near Tuxedo, N.Y. The lab will house a 5-megawatt reactor and five radioactive material cells.

• Associated Electrical Industries (Aldermaston, Berkshire, England) is operating England's first privately owned nuclear reactor, called Merlin (medium-energy light-water industrial nuclear reactor). It's a 5-megawatt reactor, will be used to test materials under radiation, produce isotopes.

• East German Nuclear Research Institute (Rossendorf, East Germany) has completed a radiochemistry laboratory, will concentrate on the production of short-lived isotopes.

• Oxford Laboratories' (Redwood City, Calif.) newly formed Analytical Division will do amino-acid analyses on a custom basis. Related services will be provided to customers concerned with the structure of proteins and peptides (e.g., medical profession, food companies).

• General Mills (Minneapolis) has awarded contracts for construction of its new research center, expected to be ready next year.

• Two new departments—polymer research and product development—will be formed at Wyandotte Chemicals Corp.'s (Wyandotte, Mich.) research division.

• The Mead Corp. will double the size of its research center in Chillicothe, O., at a cost of $1.4 million. Emphasis will be on development of specialty papers.

• Victoreen Instrument Co. (Cleveland) is putting its new industrial automation division into operation this month. The division will concentrate on new applications for radiation and radiation control in the petroleum, chemical and pharmaceutical fields.

• Linde Co., which is shopping for a new research site, has told employees that "regardless of the location or use of the new center, the present plans for Tonawanda, N.Y., include continued operation of both factory and laboratory facilities."

• Republic Steel Corp. has dedicated a new $5-million research center on a 106-acre tract on the outskirts of Cleveland. A feature of the new center is extensive use (over 10,000 ft.) of Republic's SRK (an acrylonitrile-butadiene-styrene formulation) semirigid plastic pipe.

## PRODUCTS

**Alkyl Ketones:** Aceto Chemical Co. (Flushing, N.Y.) is out with development quantities of a new group of di-n-alkyl ketones (symmetrical ketones) in the 7-carbon to 35-carbon range. Included: di-n-propyl ketone; di-n-octyl ketone; and di-n-pentadecyl ketone.

•

**Unsaturated Alcohol:** Interchemical Corp. (New York) now offers Cyclol, an unsaturated alcohol (2-hydroxymethyl - 5 - norbornene). Suggested uses: modification of condensation and addition polymers, coatings, plasticizers, lubricating oils, adhesives, and textile and paper finishes.

•

**Nitrosyl Chloride:** Henry Bower Chemical Manufacturing Co. (Philadelphia) now offers nitrosyl chloride in 55- and 137-lb.-capacity nickel cylinders. It's suggested for use in investigating conversion of citrus byproducts into essential oils, a variety of chemical syntheses (e.g., surface-active agents), catalysis, production of dye intermediates, and production of metal salts.

•

**Drug Entry:** A new soluble derivative of adrenochrome monosemicarbazone is now available from Byron Chemical Co. (Long Island City, N.Y.). The product is currently used as a hemostatic and capillary reinforcing agent.

•

**Antibiotics:** Bristol Laboratories, Inc. (Syracuse, N.Y), has turned up what it claims is a new, more useful form of tetracycline. Unlike the parent antibiotic, the newcomer can be administered by injection. Called Syntetrin, it is N-(pyrrolidinomethyl) tetracycline.

Eli Lilly & Co. (Indianapolis) is clinically evaluating a new, practically tasteless antibiotic, propionyl erythromycin lauryl sulfate.

## APPARATUS

**Drop Counter:** A photoelectric drop counter, now offered by Durant Manufacturing Co. (Milwaukee), can be used for measuring out precise

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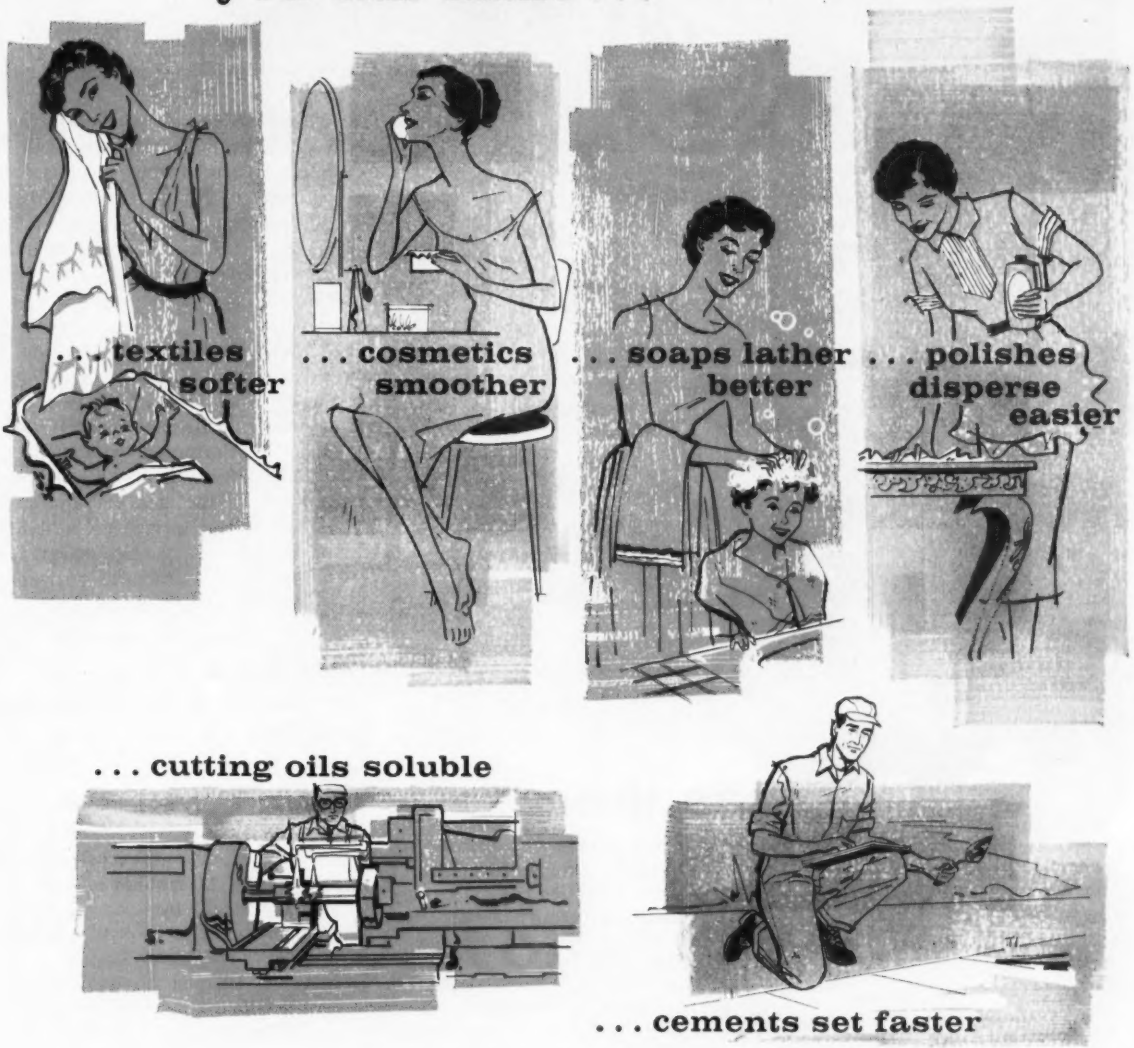
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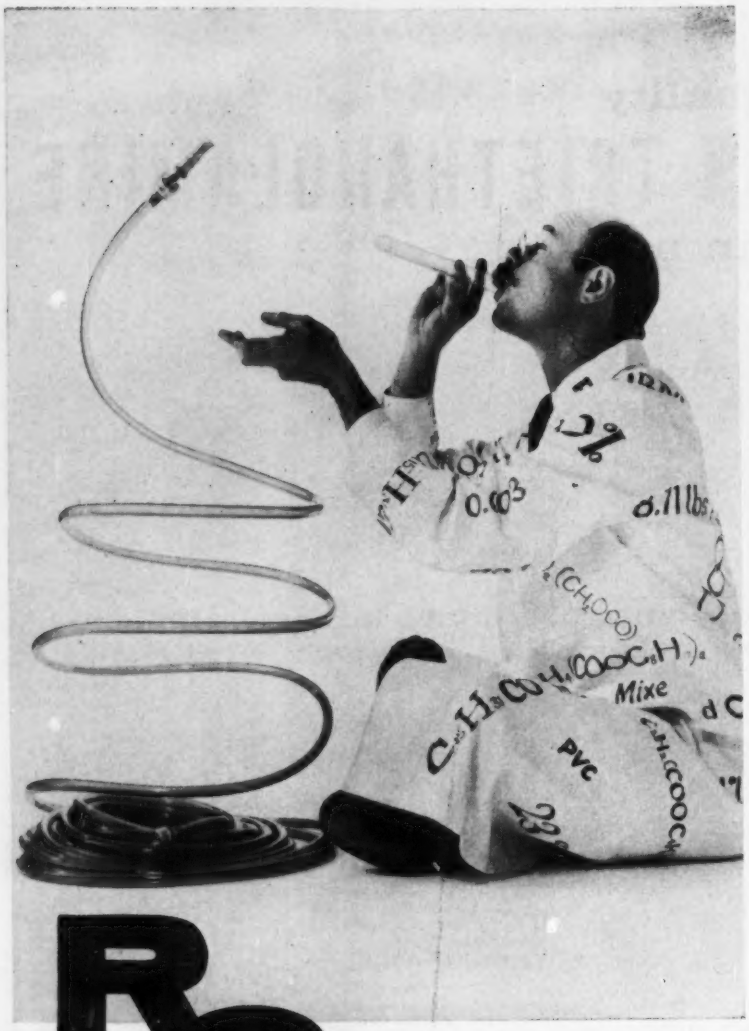


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## RESEARCH

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**Lab Demineralizer:** Betz Laboratories Inc. (Philadelphia) is out with a new lab-scale water demineralizer. The ion exchange material used is a homogeneous mixture of cation and anion resins. Capacity of the $95 unit is 15 gal./hour.

•

**Radiochemistry Micropipette:** Nuclear-Ohio, Inc. (Bay Village, O.) offers a new hydraulic micropipette designed to handle radioactive solution samples as small as one lambda. Its suggested use: in research involving solutions containing up to several curies of gamma-emitting nuclides.

•

**Slide-Rule Periodic Chart:** Graphic Calculator Co. (Chicago) is selling a plastic 4½ x 10-in. slide-rule guide to the elements. Called the Graphic Periodic Selector of the Elements it includes information on the electronic structure of the atoms, the chemical activity of the elements, the size of atoms and ions, the acidity, stability and molecular structure of chemical compounds. Price: $3.25.

## REPORTS

**These reports are available** from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

• "Thermophysical Properties of Solid Materials" (PB 151715, $6). It compiles thermophysical data for members of 11 families of solid materials, generally those having melting points in excess of 1000 F. Categories include: pure elements, alloys, ceramics (including glasses), cermets, intermetallics, polymeric materials (including plastics), and composite materials.

• "Development of Durable Flame-Retardant Finishes for Cotton" (PB 151550, $1.75). This report describes efforts of the Dept. of Agriculture researchers to attach phosphorus-containing groups to cellulose. The best finish obtained was composed of N,N′,N′′-trimethylphosphoramide, formaldehyde and methylolmelamine. The report notes, too, that phosphoro (isocyanatidates) compounds offer promise as durable flame retardants.

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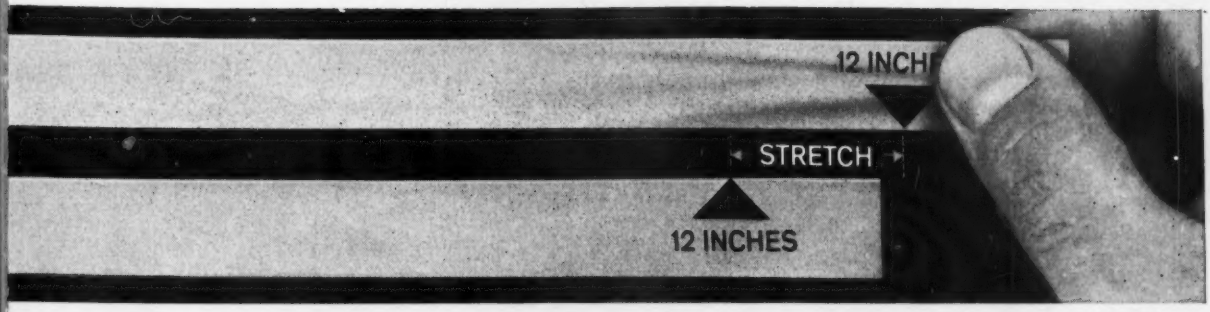


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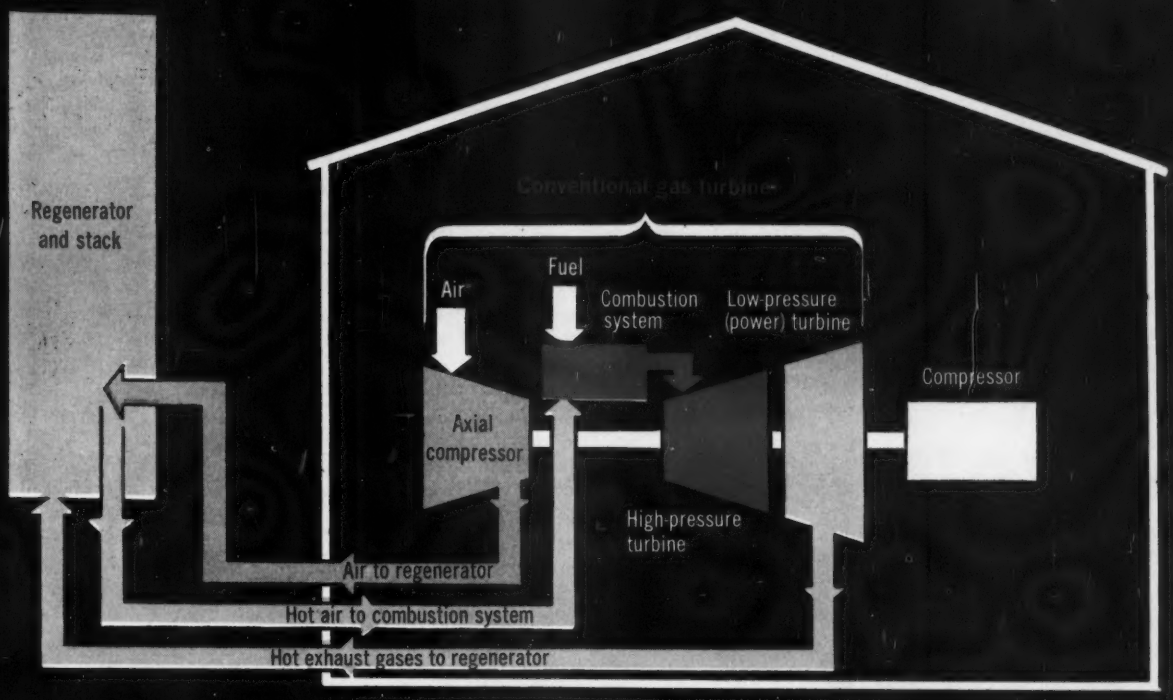
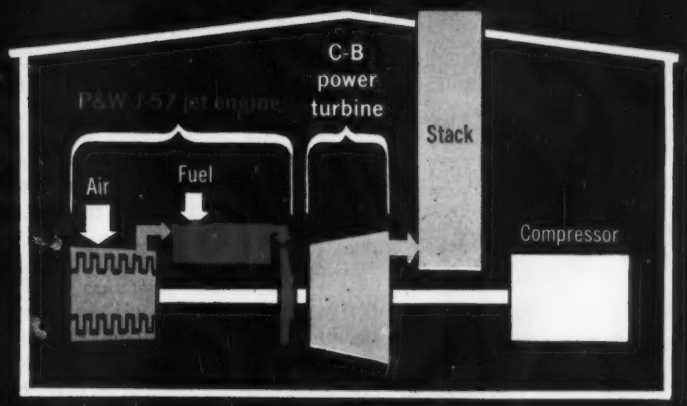
J-57 jet engine changes look of gas turbine power plant.




New aircraft jet engine-gas turbine setup (right) eliminates regeneration cycle, saves space, cuts cost, gives same efficiency as conventional gas turbine setup (above).




# Jet Power Package Bids for Process Jobs

**Chemical company executives** who fly in Boeing 707 or Douglas DC-8 jet airliners need only look out the windows for a partial preview of the process industry's newest low-cost heat and power plant package. The Cooper-Bessemer Corp. is coupling Pratt & Whitney J-57 jet engines to low-pressure (power) turbines for industrial gas turbine applications.

The sketch (*above*) shows some of the anticipated advantages of the new jet package over present industrial gas turbines in natural gas transmission service—the initial use for which the new unit is slated. The jet, more compact and lighter in weight, will cut installation costs (by as much as 50%, it is hoped) and possibly simplify maintenance.

Total installed cost of the new units still must be determined, will be based on cost analysis of the first field installations. But it is safe to say that total installed costs of any prime-mover in the gas transmission field will be in the neighborhood of $200

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per hp. installed. Installation costs generally run about half the total cost. And, C-B expects somewhat lower equipment costs as well.

The J-57's efficiency without regenerative cycle is comparable to present gas turbines with regenerative cycle. The regenerative cycle on present turbines complicates installations somewhat, but boosts efficiency 25% or more by using hot exhaust gases from the turbine section to preheat compressed air from the compressor section before the air is sent to the combustion system.

**No Flight of Fancy:** This isn't the first time that jet engines have taken on power-plant jobs. Westinghouse has put the aircraft-type engine onboard ship, using its J-34 jet with a low-pressure (power) turbine to develop 7,500 hp. for vessel flanking speed. Data on this installation, designated Navy project COSAG, was reported this spring.

And since the Westinghouse move, General Electric has been trying to sell aircraft jets (its T-58 Turboshaft engine) for shore power installations. Although industry has shown considerable interest, some buyers and turbine builders say aircraft engines lack the needed ruggedness of the heavier industrial gas turbines. So far, such engines have been suggested for limited use—as power-plant output boosters during peak load periods.

However, any industrial gas turbine manufacturer quickly points to the aircraft jet engine as the most firmly established commercial gas turbine. "To sell gas turbines, you have to prove they can do a better job than other prime-movers. In aviation, the point has been proved," says one gas turbine maker.

And, that's the reasoning Ralph Boyer, Cooper-Bessemer's vice-president and director of engineering, used when he decided to make overtures to Pratt & Whitney. "It would have taken us many years to obtain gas turbine experience on our own. The aircraft industry has made more gas turbines and has more experience with them than the industrial manufacturers," he says.

C-B, one of the major compressor makers, had carefully avoided entry into the gas turbine field until it saw natural-gas transmission business slipping away. "We have always been dedicated to efficiency, and the gas turbine with a 10-25% efficiency can't match our reciprocating engine with efficiency of about 41%. But the reciprocating engine isn't a natural power source in the oil, gas and petrochemical industry," says Boyer.

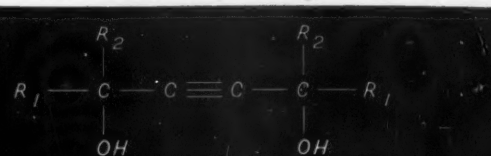
For one thing, these industries' horsepower requirements are going up. Teaming several reciprocating engines as a compressor drive hasn't worked out well. Clark Bros. has come out with larger reciprocating engines recently, but they develop only about 6,000 hp. And, generally, engines larger than about 3,000 hp. are too big to ship as a package. Gas turbines 13,000 hp. and larger are easily shipped by railroad flat car (*CW, Nov. 29, '58, p. 84*).

**New Reliability:** For a time, C-B thought the free-piston engine might be the answer, but it didn't prove out, according to Boyer. The long-range future of gas turbines has brightened considerably as efficiency and reliability have been improved by the gas turbine makers (*CW, Jan. 31, p. 54*).

By viewing a jet engine as the gas generator for a low-pressure (power) turbine, Boyer was able to help C-B gain immediate gas turbine experience. And, the jet engine concept could lower gas turbine initial cost. The P&W J-57 engine, with a 10:1 compression ratio develops the same efficiency as industrial gas turbines with regenerators (about 25%). The regenerators increase the size of the plant, and the industrial gas turbines weigh twice as much as the jet engine-gas turbine package.

But Pratt & Whitney didn't buy the concept easily. C-B decided the turbine would have to operate continuously for 8,000 hours prior to a maintenance overhaul. The J-57s operated only 1,400 hours in aircraft before being overhauled. But piece-by-piece inspections during overhauls (the J-57 has been in production use in supersonic and long-range military aircraft since '53) showed that longer-than-1,400-hour operation might be possible. And, P&W was investigating the possibilities of a continuously operating jet engine.

Laboratory testing has since convinced both P&W and C-B that the J-57 could be made to run the necessary 8,000 hours. A 600-hp. engine, with industrial modifications and C-B power turbine attached, has been run in the laboratory. And, it has been



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DEFOAMING – Surfynol 104 is recommended as a defoamer for aqueous systems. This white waxy material is also available in two liquid forms: Surfynol 104E (50% active in ethylene glycol solution) and 104A (50% active in 2-ethyl hexanol). At about .2% concentration, Surfynol 104A or 104E cuts foam in such systems as emulsion paints, paper coatings, and insecticide formulations.

DISPERSING – Surfynol TG fits the requirements of a nonionic dispersant for emulsion paints and other emulsion and water-based systems. TG is an 83% active mixture of a Surfynol and an alkyd phenyl ether of polyethylene glycol in ethylene glycol solution. It promotes increased hiding power and better color development in emulsion polyvinyl acetate, acrylic or butadiene-styrene paints.

VISCOSITY CONTROL – Surfynol 82 (dimethyl octynediol) is most active as an anti-gelling agent. In addition to its use in shampoos, Surfynol 82 is recommended for viscosity reduction in vinyl plastisols, aqueous starch solutions, and flexographic inks.

VOLATILE WETTING – Surfynol 61 (dimethyl hexynol) is a volatile wetting agent. Surfynol 61's volatility permits easy elimination from a system after its work is done. One example is in glass cleaning formulations where Surfynol 61 helps solubilize dirt but leaves no film on the glass after cleaning.

**INVESTIGATE SURFYNOLS** if lower cost surfactants have not proven satisfactory. Airco's experienced technical representatives are always ready to assist you. For on-the-spot help or information call or write.

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**AIR REDUCTION CHEMICAL COMPANY**

Represented Internationally by Airco Company International

*Divisions of Air Reduction Company, Incorporated*

150 East 42nd Street, New York 17, N. Y.

proved that the J-57 operates satisfactorily using natural gas as a fuel. Its 1400 F operating temperature is in the same range as conventional gas turbines.

**New Idea in Overhaul:** When the new turbine package is placed into operation, a new maintenance concept will go with it.

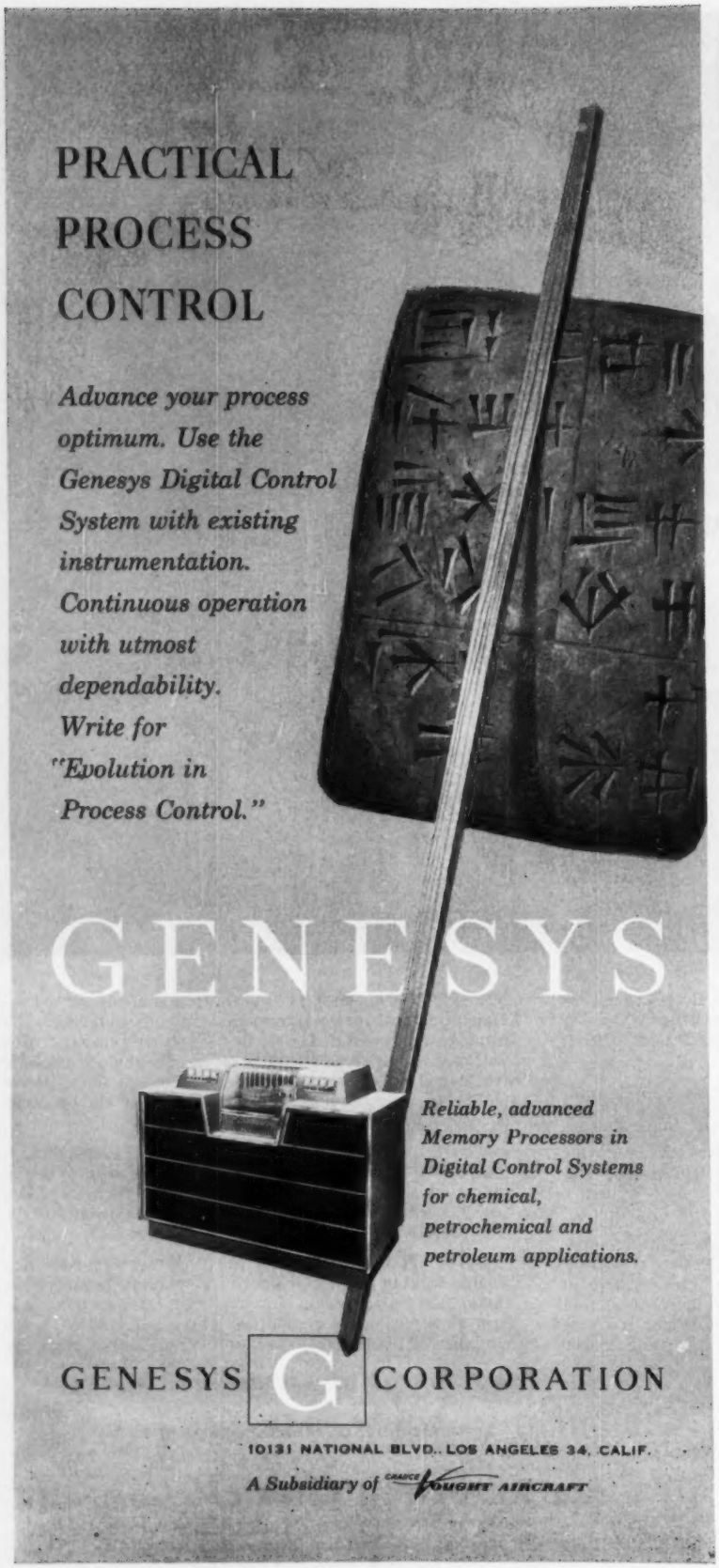
The new unit's jet engine section is light enough to be lifted with a chain hoist. Plans are to pull the modified J-57 completely off the production line, return it to the factory for overhaul. A substitute unit can be put into place within four hours, according to Boyer. "And, this is based on Pratt & Whitney's saying that it can be done in 45 minutes on the Boeing 707," he adds. Conventional turbines are overhauled in the field, with aid of a heavy overhead crane.

Details haven't been worked out (e.g., arrangements for substitute units, shipments back to the factory). But the technique will permit maintenance crews to be cut, and will reduce overhaul time from days to hours. And, Boyer points out, the engines can be shipped by air to remote locations.

**In the Future:** C-B and P&W have agreed that C-B will market the modified J-57 turbine package in an exclusive arrangement. And, although first application will be made in the gas transmission industry, C-B looks for refinery, petrochemical and chemical applications. The first unit, a 10,500-hp. model, is now under construction, will be installed in the field early in '60.

C-B and P&W will wait for completion of successful field trials before other sizes are considered. But it's a good bet that the 10,500-hp. model won't be the only size. For example, the lower cost of the new setup may make production of smaller gas turbines economical, help sell them to chemical plants for many lighter-load applications. Turbine makers admit they cannot now economically make conventional units smaller than 4,000 hp. And they haven't been very successful in convincing companies that several loads can be reliably hooked up to one large turbine.

But progress to new sizes will probably be slow. Boyer admits: "We won't be without our field troubles." Other turbine makers express some doubts that the new units will meet industry's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CONTROL
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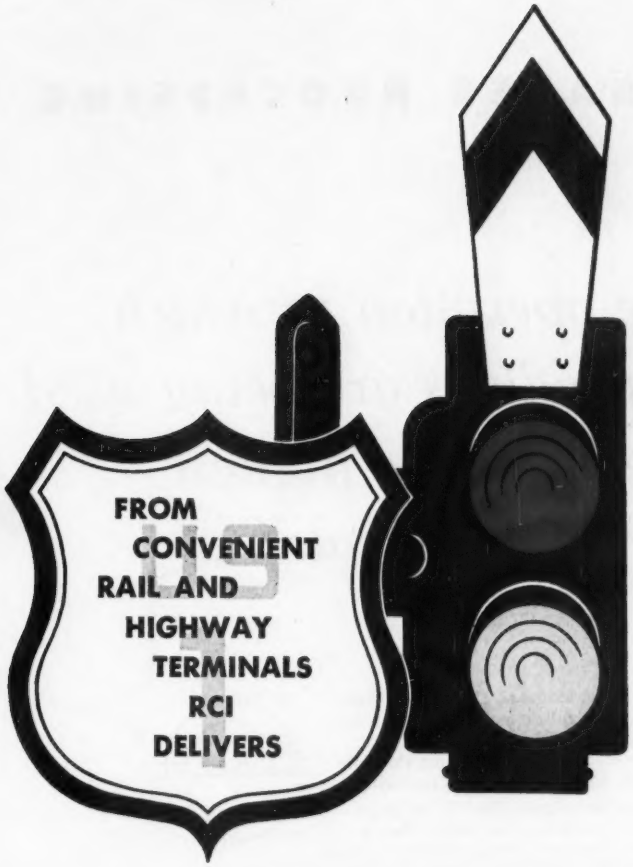


# FORMALDEHYDE

***IN 5 DIFFERENT CONCENTRATIONS***

If you manufacture resins, adhesives, textiles, leather, rubber, or any one of a dozen other products, you very likely depend on regular deliveries of formaldehyde. Reichhold has the concentrations you need, and can also maintain fast delivery of large quantities from these convenient shipping points: Ballardvale, Mass.; Charlotte, N. C.; Detroit, Mich.; Elizabeth, N. J.; Hampton, S. C.; Kansas City, Kan.; Tacoma, Wash.; Tuscaloosa, Ala.

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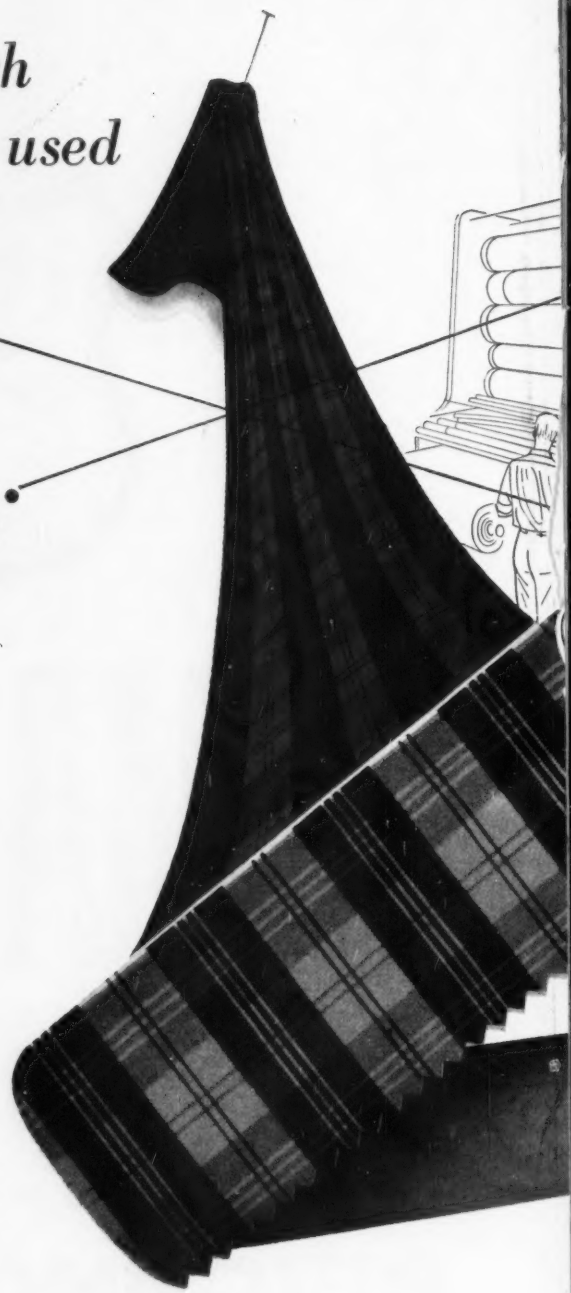
## BAKER PROCESSING CHEMICALS...

*"The operation in which your products are being used requires the highest purity of chemicals."*



EVERY YEAR, 9,000 looms at Dan River Mills weave 149,432 miles of fabric, sufficient to encircle the earth six times at the Equator. This is an impressive achievement—an outstanding example of high speed, high quality, *precision* processing.

J.T.Baker CHEMICAL

Like most precision industries, Dan River Mills demands precision processing chemicals. This is particularly true of the revolutionary new processes used for the production of Wrinkl-Shed® and Wrinkl-Shed with Dri-Don® finishes. To quote from their letter:

*"The operation in which your products are being used requires the highest purity of chemicals . . . Few industries require the exacting service that the textile industry demands . . . Baker has consistently met the specifications . . ."*

J. T. Baker is proud to be one of Dan River's trusted suppliers. We are proud to be a trusted supplier of high purity chemicals to a great many of America's key industries.

The chemical requirements of *your* industry may, of course, be highly specialized. Your processing problems and techniques may be unique. May we suggest, however, that you investigate the advantages and economies of J. T. Baker industrial chemicals? They offer you exceedingly high standards of purity. They are dependably pure, dependably uniform, lot after lot, ton after ton. They are competitively priced.

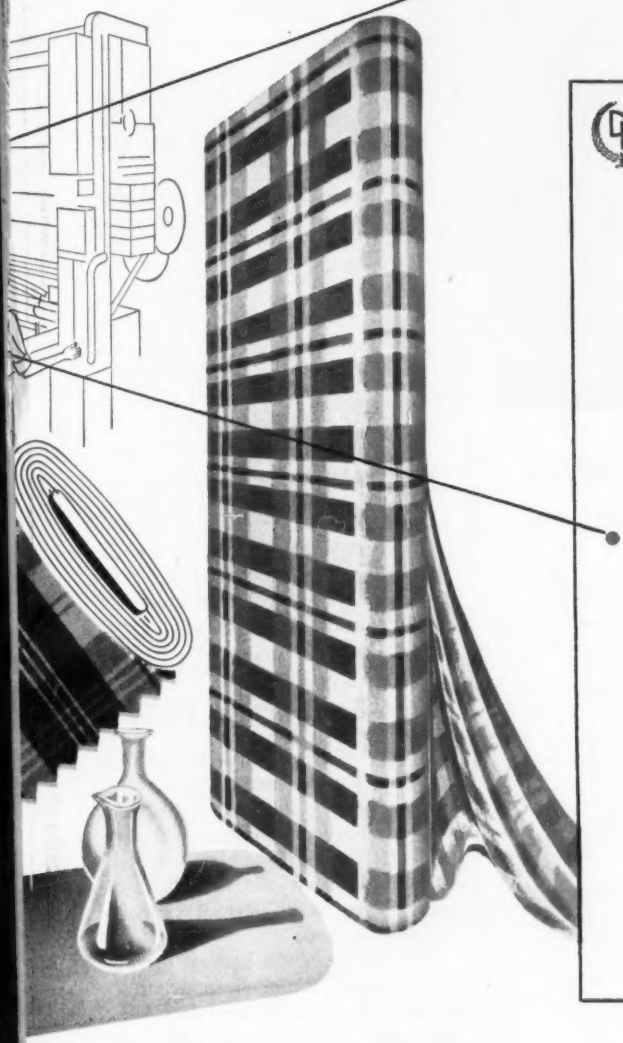
Would you, for example, like to speed up your processing? Minimize costly interruptions? Eliminate variables? Save one or more purification steps? Reduce the number of rejections? Have you considered the use of chemicals made to your *exact* specifications?

We would appreciate the opportunity to quote on your requirements. Needless to say, we will always consider your precious trademark as precious as our own.

**J. T. Baker Chemical Co.**
**Phillipsburg, New Jersey**

**PURITY BY THE TON — FOR**

# *one of the guardians of this precious trademark*



DAN RIVER MILLS
INCORPORATED
*Danville, Virginia*

March 26, 1959

J. T. Baker Chemical Company
Phillipsburg
New Jersey

Att'n: Mr. Charles H. Slater

Gentlemen:

Every one of our suppliers plays an important part in the success of "Dan River Fabrics". The performance of J. T. Baker Chemical Company, as one of these suppliers, has been one of which you can be proud.

The operation in which your products are being used requires the highest purity of chemicals and we have never found it necessary to complain to your company on quality. Baker has consistently met the specifications.

Few industries require the exacting service that the textile industry demands and here again your company's performance has "measured up". Your delivery promises have proved dependable, indicating a good organization backing up the efficient sales force.

It is fitting that two companies who have contributed to each other's success should now be associated in a "Precious Trade Mark" program. It is a pleasure to do business with J. T. Baker Chemical Company.

Yours very truly,

DAN RIVER MILLS, Incorporated

By C. M. Vernon

C. M. Vernon
Director of Purchases

CMV/mt

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Whether your requirements are large or small, a Richardson Select-O-Weigh automatic proportioning system offers you the advantages of – **1.** Savings in labor costs. **2.** Increased productivity. **3.** Quality control. **4.** Better housekeeping. **5.** Permanent printed records. Incorporated into and governed by a Select-O-Weigh System are such units as –

**Feeders** – Designed to handle your material quickly and quietly – hundreds in use on all kinds of products.

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**Controls** – Program your production and processes by punched card, formula board, formula capsule or weight-selector verniers. Only Richardson offers all four. Control is from a single electronic panel board, operated by one man. No special training is required.

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Richardson Scales conform to U.S. Weights and Measures H-44 for your protection.

*Here's the answer . . .*

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MATERIALS HANDLING BY WEIGHT SINCE 1902

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rugged operating and maintenance requirements. For example, GE's maintenance goal is 8,000-8,700 hours before initial shutdown for inspection; after the first inspection, the equipment should go on a three-year maintenance cycle.

Industrial gas turbine makers point out that aerodynamically their turbines have much in common with jet engines. But they add that mechanically they are different. For example, industrial units have heavy metal parts designed with rupture stresses of 100,000 operating hours. But one manufacturer admits that time-life curves for design stresses become difficult to interpret as operating time increases. The question is: Do lighter jet engines have comparable stresses?

Also, while the jet-engine units have a higher efficiency than present gas turbines without a regeneration cycle, in many process applications the regeneration cycle isn't needed. In these applications, the gas turbine is counted on for supplying heat to the process or to a steam boiler. The gas turbine, when credited with the heat, winds up with an over-all efficiency of 60-65%.

However, gas turbine makers agree that the C-B J-57 unit is intriguing. "We'll be watching this one closely because, if it does work out, it could change the whole concept of the industrial gas turbine," says one manufacturer. It's a good bet that the chemical industry will be watching it closely, too.

## Heat Exchanger Help

**This week chemical plant process engineers have a simpler way to select correct shell-and-tube heat exchangers for specific plant applications. Key to the technique is a manual produced by Patterson-Kelley Co. (East Stroudsburg, Pa.) that classifies various standard designs.**

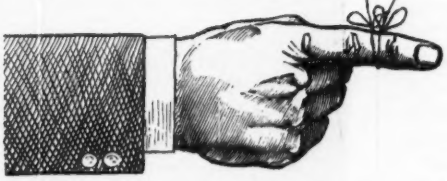
P-K developed the manual for use as a "basic communications tool" between design engineers and heat-exchanger manufacturers. The company points out that while the manual bears the Patterson-Kelley name on each page, all the designs are common throughout the heat-exchanger field.

P-K has code-named each exchanger type and part to assure that everyone involved in exchanger de-

just 5 years old

Oronite's PHENOL plant

is AGAIN EXPANDED



Increasing demand for Oronite Phenol U.S.P. has resulted in another expansion of Oronite phenol production. This second expansion marks an almost 50% increase in Oronite's phenol capacity since the plant was inaugurated only 5 years ago.

The new production attests to the high quality of Oronite phenol as well as Oronite's willingness and ability to meet their customer's requirements.

If your process requires a highly pure phenol, or if you want to be assured of a most dependable source of supply—now and in the years ahead—talk over your requirements with Oronite.

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A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY

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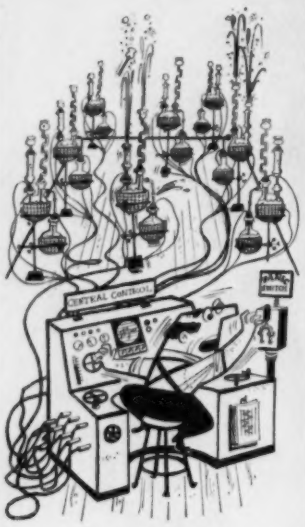

**Why bother when you can get it from Eastman?**

When you need a special organic in a quantity that strains your laboratory facilities or ties up your staff, try Eastman Organic Chemicals Department, *Distillation Products Industries,* Rochester 3, N. Y.

there are some 3700 Eastman Organic Chemicals for science and industry

DISTILLATION PRODUCTS INDUSTRIES
*is a division of*
EASTMAN KODAK COMPANY


## PRODUCTION

sign and purchase can use the same terminology.

P-K says it has placed some manuals on field trial. And in one case a chemical company was able to successfully order a number of heat exchangers by telephone, merely by giving dimensions of the code-numbered components.

By making it simpler to work out and order the proper heat exchanger, P-K figures it can cut some expensive—and often unnecessary—engineering work. The firm has hopes that the improved and less costly communications between maker and purchaser will help stamp out the widespread practice of chemical companies' turning equipment designs over to small job-shops for fabrication (*CW, March 14, p. 85*).

**Standard Problems:** A look at the new manual points up some of the problems that may face an American Standards Assn. subcommittee that meets later this month to discuss the basic steps required for industry-wide heat exchanger standardization.

P-K feels that the manual is a good start toward this. The ASA move is sponsored by the tubular-exchanger manufacturers and the Manufacturing Chemists' Assn. But, reasons P-K, the job is so complex, the manufacturers' best bet is to try to do a standardization job of their own, then offer this to the ASA committee for further work.

## EQUIPMENT

**Magnetic Separator:** A new high-intensity magnetic separator is being offered by Dings Magnetic Separator Co. (4740 West Electric Ave., Milwaukee 46). Called Type IR, the new unit offers efficient separation at capacities up to 800 lbs./hour/inch of rotor width. The machine is manufactured in widths from 2 to 30 in. and with 1 to 7 rotors.

•

**Mechanical Rake:** A new mechanical rake for automatically clearing trash from grate-covered water inlets is offered by Frank W. Stuker & Associates (360 Delaware Ave., Buffalo 2, N.Y.). The rake removes material ranging from light debris and heavy waterlogged wood from inlets to large water-consuming equipment, thus eliminating service interruptions.


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4 Pure Chromium Oxides
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2 Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.

Your nearest Williams representative will be glad to provide you with full technical data and samples, or write Dept. 39, C. K. Williams & Co., Easton, Penna.

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# THIOKOL LIQUID POLYMERS

*stand behind another forward step in product design*

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Simplicity of molding castings is shown in pouring and removal of Wallace & Tiernan nameplates. Hardware is embedded into plastic before curing.

## Cold-casting with THIOKOL LP/epoxy compound produces durable parts . . . saves time, money . . . eliminates inventory problems—at Wallace & Tiernan

Manufacturer of chlorinators and other quality industrial equipment, Wallace & Tiernan turns out its own product nameplates, baseplates and a variety of integral parts—*in plastic at home.* No special machinery is required.

A mixture of THIOKOL liquid polymer, epoxy resins, curing and coloring agents is prepared manually and poured into molds. The compound cures by itself at room temperature, resulting in plastic end items that are durable and chemical resistant. The molded parts can be simple or intricate in form, custom-colored for beauty and function.

Units are made on demand. No large quantity of stock need be maintained. Outside suppliers are eliminated. And unit costs come down—from $40 to $4, in some cases.

For full information, write THIOKOL at address below.

**Thiokol® CHEMICAL CORPORATION**

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®Registered trademark of the Thiokol Chemical Corporation for its liquid polymers, rocket propellants, plasticizers and other chemical products.

A wide range of durable, flexible plastic parts are produced by this unique molding technique.

# THE UNVARNISHED FACTS

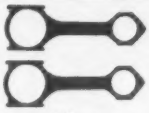
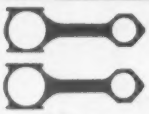
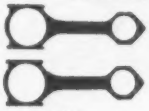
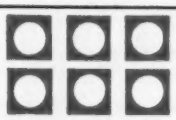
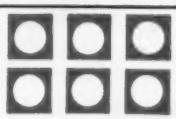
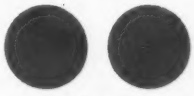
## about engine compressors in the 375 to 950 hp range

| FEATURE | WORTHINGTON SLHC | MFR. A | MFR. B | MFR. C |
|---|---|---|---|---|
| DESIGNED FOR TURBOCHARGING | Yes | No | No | No |
| SELF-SUSTAINED TURBOCHARGING | YES | NO | NO | NO |
| FUEL CONSUMPTION | 7,000 BTU/BHP HR | 9,000 BTU's | 8,600 BTU's | 8,500 BTU's |
| CYCLE | 4 | 2 | 2 | 4 |
| CYLINDER ARRANGEMENT | Inline | Inline | Vee | Vee |
| RPM | 450 | 600 | 450 | 400 |
| YEAR ENGINE WAS DESIGNED | 1955 | Before 1950 | Before 1940 | Before 1940 |
| NUMBER OF DESIGNS TO COVER RANGE | 1 | 2 | 2 | 2 |
| LARGEST UNIT FOR SKID MOUNTING | 950 HP | 660 HP | 1100 HP | 660 HP |

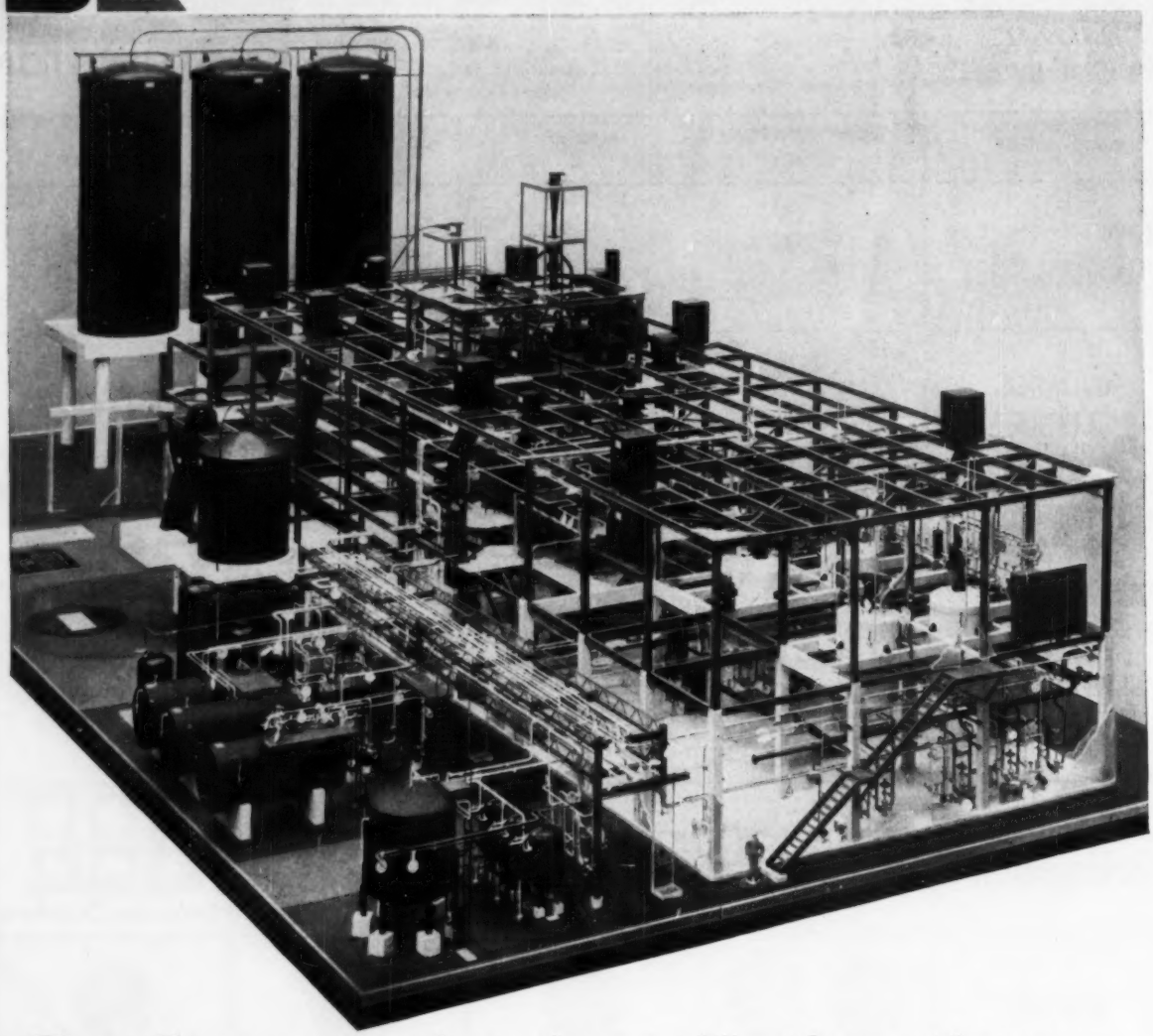
On these two pages you'll find a comparison of all the significant facts about gas engine compressors in the 375 to 950 horsepower range. We think you'll have to agree that Worthington's SLHC unit is the outstanding performer in its size range. Not only does it have 18% better fuel economy than the next nearest engine, but it also features self-sustained turbocharging, removable cylinder liners with cast-in water jacket, interchangeable power and compressor rods, and many other important engineering advances.

For complete details on the new SLHC engine compressor get in touch with your nearest Worthington district office. Or write to Worthington Corporation, Section 43-4, Harrison, N. J. In Canada: Worthington (Canada) Ltd., Brantfold, Ont.

WORTHINGTON

| FEATURE | WORTHINGTON SLHC | MFR. A | MFR. B | MFR. C |
|---|---|---|---|---|
| MOUNT CYLINDERS ON BOTH SIDES | Yes | No | No | No |
| CYLINDER LINERS | Removable | Removable | NONE | NONE |
| INTERCHANGEABLE POWER AND COMPRESSOR RODS |  Yes |  Yes | No | No |
| SIDE BY SIDE CONNECTING RODS |  Yes | Yes | No | No |
| FRAME CONSTRUCTION | En-bloc | En-bloc |  Separate Cylinders |  Separate Cylinders |
| IGNITION |  Twin | Single | Single | Single |
| RUNNING GEAR LUBRICATION | MANIFOLD CAST IN BASE | SEPARATE PIPE MANIFOLD | SEPARATE PIPE MANIFOLD | SEPARATE PIPE MANIFOLD |
| GASKET-FREE CYLINDER HEAD SEATS | YES | NO | NO | NO |
| RUNNING GEAR EASILY ACCESSIBLE | YES | NO | NO | NO |

*Blaw-Knox designs and builds Cosden's polystyrene plant.* Builder of over 90 plastics and resins plants, Blaw-Knox is a leading contractor for this industry's most progressive projects.



# Cosden cut pipe installation time by two months with this model

Compared with equivalent projects using conventional design-construction methods, Blaw-Knox's unique model approach builds a plant faster, and at lower cost.

Blaw-Knox makes maximum use of a model as a working tool—to improve visualization, to minimize material and labor costs, and to permit faster field erection without further drafting in the field.

See how this engineering ingenuity can pay off on your next plant or process project. Contact Blaw-Knox Company, Chemical Plants Division with headquarters in Pittsburgh. Branch offices in New York; Haddon Heights, N. J.; Washington, D. C.; Birmingham; Chicago; and San Francisco.

*plant builders for industry...* BLAW-KNOX

# USBM Route Makes Five Thorium Hopefuls

**A promising new route to thorium, developed by the U. S. Bureau of Mines at Albany, Ore., is adding interest to the Atomic Energy Commission's recently initiated thermal breeder program (CW, Aug. 29, p. 89).**

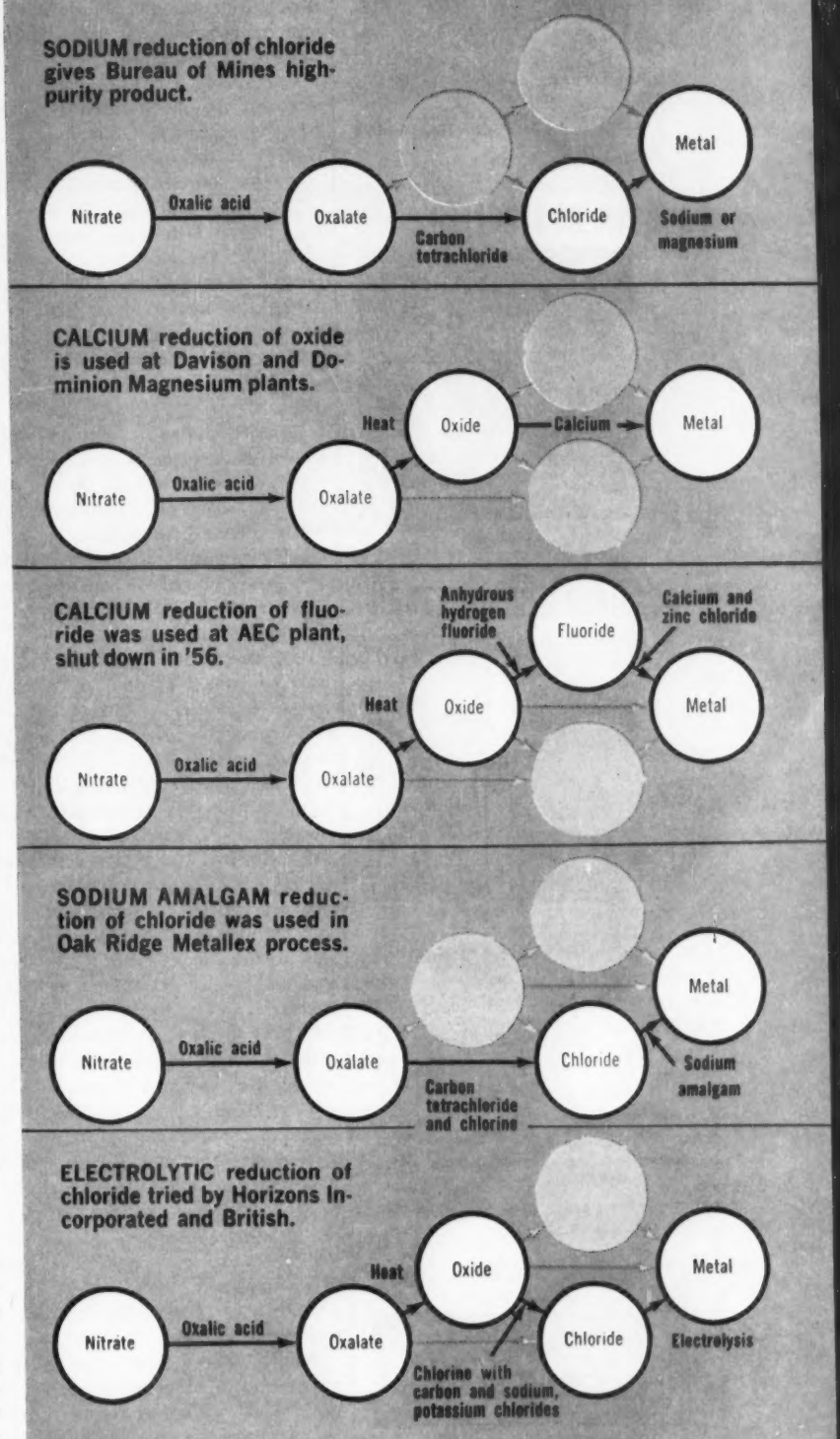
Although entering a scramble of competing processes (*right*) for making a metal with a questionable future, the USBM sodium-reduction route is capable of producing a very pure product — 99.8% thorium with an oxygen content of 200-500 ppm. This not only may give it a competitive edge but also may even improve the outlook for metallic thorium as a reactor fuel.

Thorium compounds are receiving close attention as potential fuel materials, but corrosion is a problem in their use, gives the metallic (or alloyed) form a good chance in the race.

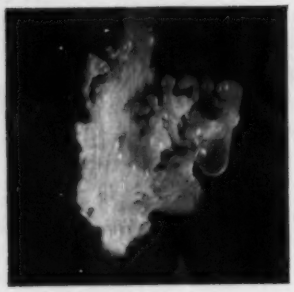
AEC had high hopes for thorium when it started up a 20-tons/month plant (operated by National Lead Co.) at Fernald, O., in '54. But it shut down the plant two years later, still has a stockpile of thorium made there by the fluoride-reduction process developed at Iowa State College (Ames).

Current commercial producers of the metal are Davison Chemical Division of W. R. Grace & Co., at Erwin, Tenn. (*CW, March 8, '58, p. 44*) and Dominion Magnesium Ltd., at Haley, Ont. Both use calcium reduction of the oxide. Metal Hydrides Inc. makes a higher-purity grade (under 50 ppm. oxygen) of thorium at Beverly, Mass., by thermal decomposition of the iodide (*CW, July 13, '57, p. 27*). Other processes have been carried out on a small scale by the Oak Ridge National Laboratory, Horizons Incorporated and several other laboratories in the U.S. and abroad.

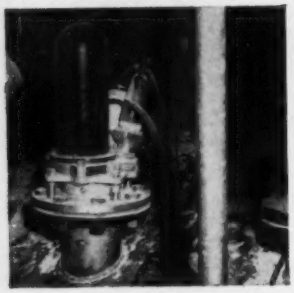
**Limited Enthusiasm:** Current outlook for this up-and-down metal is one that might be described as cautious optimism. Potential producers are hoping that the new AEC program will pay off in about five years with a decision to build some thermal breeder reactors (which would utilize metallic or compounded thorium to



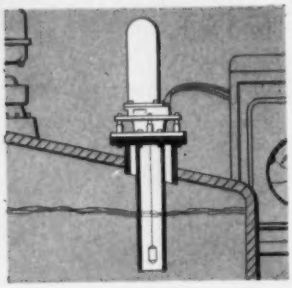
YES, NOW VISCOSITY



CAN BE CONTINUOUSLY
PROCESS CONTROLLED



WITH THE
BROOKFIELD VISCOMETRAN



UNDER actual process conditions, the Brookfield Viscometran accurately and continuously measures, records and controls viscosity. Readily mounted and integrated in existing processes, the Viscometran offers significant economic advantages over other methods of indicating degree of reaction, degree of polymerization or determination of process end point. Viscosity is very likely a variable that is fundamental in your process. For complete information about how the Brookfield Viscometran can provide continuous "in process" measurement of this product dimension for you, write—

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breed fissionable uranium-233). Meanwhile, there's no immediate prospect of a big demand for nuclear-grade thorium. Somewhat less pure alloy grade, used by Dow and others in making missile and aircraft alloys with magnesium, has an established market, though.

One reason for AEC's loss of interest in the metal three years ago was undoubtedly due to the high oxide content of the material it produced.

At that time, oxygen was not considered to be nearly as critical an impurity as it is in other metals such as titanium. Specification for nuclear-grade thorium was set at 1% thorium oxide (equivalent to about 1,200 ppm. of oxygen). And the metal produced at Fernald frequently missed even this specification, often had about 3% oxide.

Recent studies, however, have shown that oxygen does have noticeably detrimental effects on the mechanical properties of the metal, causing it to have poor ductility, possibly lower resistance to radiation damage. Thus, the purer the metal, the better its chances of making the grade as a "bigtime" nuclear fuel.

**Old Route Revived:** The process used by USBM to produce the pure metal — sodium reduction of the chloride — was one of the first attempted when thorium was discovered over 100 years ago, but it was soon discarded because it made powder with a high oxide content (over 3%). However, the recent application of the Kroll technique (reduction by magnesium) to titanium, zirconium and hafnium has brought new know-how to the effective use of the alkali and alkali earth metals as reducing agents.

USBM first tried magnesium reduction, added sodium reduction for comparison, switched its emphasis to sodium about a year ago. Results indicate that sodium gives purer product than magnesium, with greater ease of operation, but some loss in yield.

In addition to producing a purer product than its century-old ancestor, the new sodium process yields thorium in sponge form rather than as a fine powder, thus reduces fire hazard and handling problems.

**Batch Process:** Since the method requires high temperature and vacuum, it's carried out in batches. Starting material is the commercially available thorium nitrate tetrahydrate, which is used by virtually all workers to obtain the oxalate by treatment with oxalic acid. USBM uses carbon tetrachloride to convert the oxalate directly into thorium tetrachloride, which is purified by distillation in nickel equipment.

The purified chloride is reacted with sodium by heating it, under an inert atmosphere, in a titanium crucible. The reaction starts at 350-400 C, is completed by heating to 850 C. After the reaction, the vessel is evacuated, and sodium chloride and excess sodium are distilled off at 900 C under high vacuum. High-purity thorium sponge is recovered for vacuum arc melting to ingots.

Major problem, says USBM, is the production and handling of the thorium tetrachloride. It's an unstable and highly corrosive substance that is now made only in small batches. Materials of construction are thought to be a major problem in the design of a continuous chlorinator.

Other angles being studied by USBM are to increase reaction efficiency and product purity.

**First Large-Scale Route:** The AEC Fernald plant run by National Lead was the first to make thorium on a large scale, used the Ames fluoride route. Low-temperature calcining of thorium oxalate produces a reactive form of the oxide, which can be converted into the tetrafluoride with anhydrous hydrogen fluoride. (The direct fluorination of the nitrate was studied but abandoned because of excessive corrosion.)

Reduction of the fluoride to the metal was carried out with calcium (with zinc chloride added to boost the available heat of reaction). The product was a thorium-zinc alloy, from which the zinc was removed by distillation to leave thorium sponge.

**Oxide Way Now Commercial:** About the time that the Fernald plant was in operation, a method of directly reducing thorium oxide with calcium was under study at Sylvania (now discontinued) and other laboratories. Davison Chemical, after studying various processes, chose this one for its new nuclear feed materials plant at Erwin. And Dominion Magnesium has used the same route at its 10-tons/month plant for making alloy-grade thorium since about '50.

When used for making alloy tho-

rium, the process calls for commercial calcium, not-too-rigorous control of thorium oxide production. Nuclear-grade thorium requires only purer oxide, redistilled calcium.

The major disadvantage of the calcium reduction of the oxide is that it produces pyrophoric powdered thorium. In addition to requiring care in handling, this finely divided metal must be kept entirely free from oxygen contamination.

**Oak Ridge Route:** Research on a thorium reduction process started at Oak Ridge National Laboratory in '54, centered on a sodium amalgam reduction of the chloride. Dubbed the Metallex process, the Oak Ridge work featured a continuous reduction step. It had advanced to the point where it could turn out 3.5 lbs./hour of thorium by the time growing discouragement with the metal caused process work to be discontinued in '57. Hopes are that the project, can be picked up again if thorium interest revives as expected.

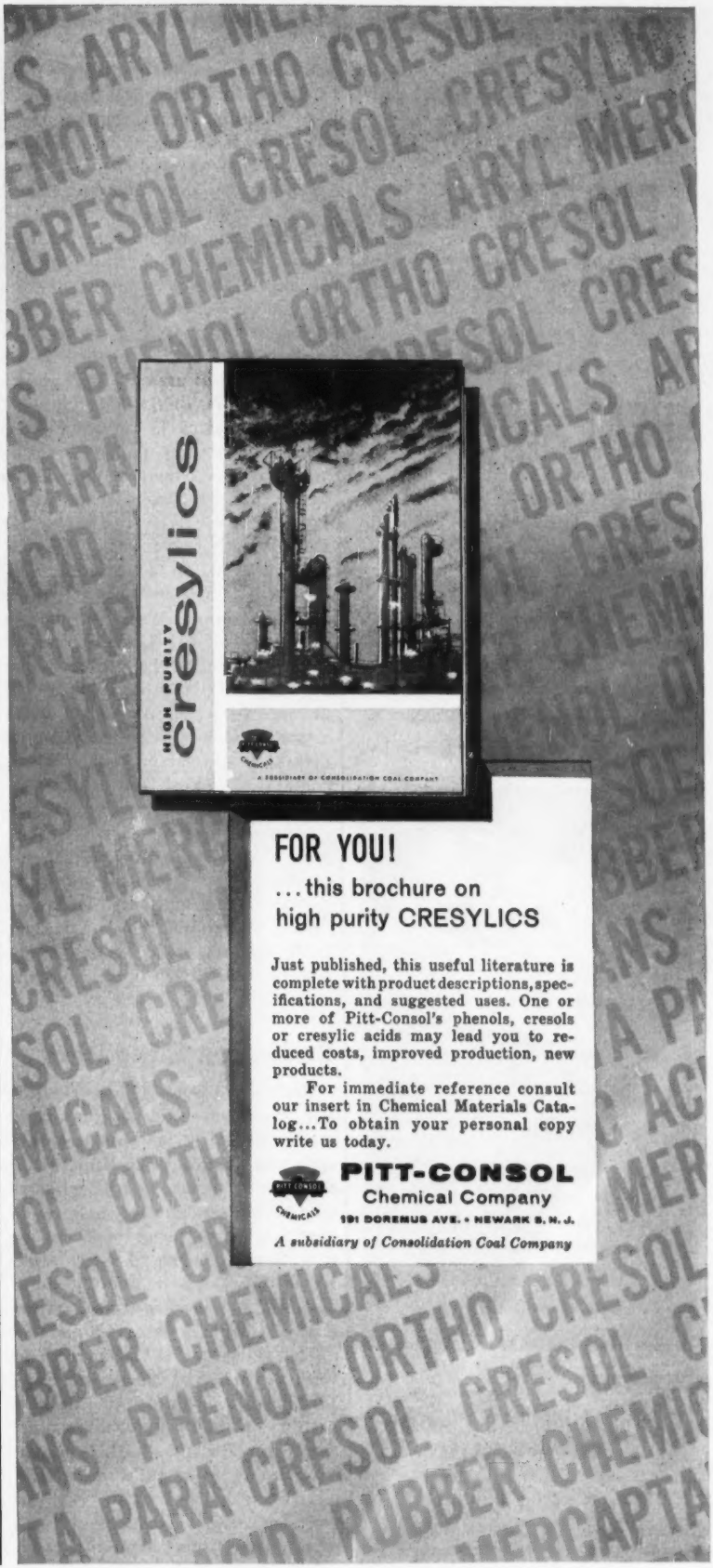
Chlorination was carried out by adding carbon tetrachloride (with a small amount of chlorine to inhibit side reactions) to thorium oxalate pellets, heating to 320 C, then to 675 C to complete the reaction.

Continuous reduction was achieved by contacting the chloride with sodium amalgam (about 0.3% sodium dissolved in mercury) in an agitated stainless steel vessel at 130 C, continuously removing the product by an overflow arrangement.

In the final steps, the product mixture was washed with hydrochloric acid and water, filter-pressed and vacuum-sintered to give thorium billets. Final purity levels of 600 ppm. oxygen were obtained.

**Electrolytic Process:** A method that's been studied by various researchers, including Horizons Incorporated, is the electrolytic reduction of various thorium salts. Most promising version involves chlorination of thorium oxide in the presence of carbon in a fused-salt bath of sodium and potassium chlorides. Electrolyzing the chloride in the salt bath eliminates the problems inherent in isolating and purifying the chloride.

A British team, representing the Atomic Energy Authority and Diamond Products Ltd., reported to the Geneva Conference last year that such a method produces thorium with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an oxygen content of 500-900 ppm.

**Iodide for Purity:** Still unsurpassed for producing top-purity thorium is the thermal decomposition of the tetraiodide. Metal Hydrides uses ordinary reactor-grade thorium metal chips as feed material for its process. Iodine reacts with the metal in a heated vacuum to form the volatile iodide, which is decomposed on a hot wire to form crystal-bar thorium, containing less than 50 ppm. oxygen. The high expense of this method is the drawback to its use on a large scale.

Commonwealth Scientific and Industrial Research Organisation (Melbourne, Australia) presented an alternative iodide route at the Geneva Conference: production of the iodide from thorium carbide. The carbide can be prepared from commercial thorium oxide in a relatively pure form (e.g., 1,500 ppm. oxygen, 1,000 ppm. carbon), which is suitable for direct reaction with iodine, subsequent decomposition to the metal. Major advantage, if the process proves out on more than laboratory scale, is the ability to use lower-cost feed material than the conventional iodide route.

**No Winner Yet:** Despite the years of research that have gone into thorium processing, there doesn't yet appear to be any one process that surpasses the others in enough respects to rule out its competitors. A new and tighter AEC specification for nuclear-grade thorium, which seems likely, may be the first step in concentrating attention on fewer processes.

## Radiation Education

**Radioactive isotopes, over the past few years, have won their spurs in a wide variety of industrial measurement and control applications. But if the benefits to the processing industries of these atomic-age tools are to continue, management must set up educational programs to assure workers of the extensive safety features designed into instruments employing relatively nonhazardous isotopes.**

That's the gist of comments last week by Industrial Nucleonics Corp. (Columbus, O.) on the problems confronting industrial isotope manufacturers, now that the public is becoming more aware of radiation hazards. It's not that the industrial devices represent serious hazards — on the contrary, facts substantiate the manufacturers' claims that the instruments are generally no more hazardous than a luminous-dial wristwatch.

However, these facts are of little help, says INC, in combating the hysteria generated by numerous articles on atomic-bomb fallout and high-level radioactive waste disposal. In the public mind, all types of radioactivity become "hazardous", and many of the real dangers associated with such deadly isotopes as strontium-90 rub off on their relatively harmless industrial cousins.

**Irrational Fears:** INC cited several cases in which workers' irrational fears about working in areas near isotopic instruments created unnecessary problems. In one refinery, for example, an isotope gauge is used to indicate when a coke drum on one of the processing units is filled. The area is properly marked by a sign indicating that radiation is present and that, as an added precaution, workers should not spend more than 25 hours a week in the vicinity.

In this case, the warning was more than observed. Instead of using the catwalk that passed by the gauge, operators chose to climb down one 60-ft. ladder and back up another one, to avoid the "hazardous" area. Union members said they would file a grievance and ask for premium pay if required to use the catwalk.

According to INC, this type of situation could be avoided by adequate training programs designed to enable workers to distinguish between various levels of radiation hazard. INC briefs union stewards, supplies explanatory booklets when a new system is installed; but continuing education by management is important to keep employees aware of the facts. Otherwise, there's the danger that original assurances will be forgotten in the emotional reaction to public accounts of high-intensity radiation hazards.

## Cryogenic Progress

**Latest developments** in low temperature physics and chemistry were key subjects last week at the Fifth Annual Cryogenic Engineering Conference, held at the University of California (Berkeley). Among topics: description of super-insulation systems, manufacture and handling of liquid hydrogen and helium, effect of

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|---|---|---|---|---|
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| 930 | 3 | 12 Max. | 30-45 | — |
| 940 | 3 | 12 Max. | 15-30 | — |
| 950 | 3 | 12 Max. | 7-15 | — |

| Thermo-setting VERSAMIDS | Amine Value* | Color—Gardner | Viscosity**—Poises—40° C | Viscosity—Poises—150° C | Viscosity—Poises—75° C |
|---|---|---|---|---|---|
| 100 | 89-93 | 12 Max. | — | 7-12 | — |
| 115 | 210-220 | 12 Max. | 500-750 | — | 31-38 |
| 125 | 290-320 | 12 Max. | 80-120 | — | 7-9 |
| 140 | 350-400 | 12 Max. | — | — | 2-6 |

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## ENGINEERING

cryogenic temperatures on materials of construction.

National Bureau of Standards cryogenic engineering laboratory (Boulder, Colo.) contributed reports on several of these projects. The superinsulator developed at the NBS lab is a multiple layer system, consisting of alternate layers of poor thermal conductors and good reflectors. Depending on the materials used, performance can range from four to 30 times that of conventional insulating materials. Best combination yet is aluminum foil separated by 5-mil-thick fiber-glass paper.

Less expensive, but also less effective, insulating systems studied by NBS include evacuated powders, the best of which to date is a mixture of silica aerogel and aluminum powder. Small aluminum particle size gives better insulating ability.

**Hydrogen and Helium:** Another NBS report indicated that liquid hydrogen (–424 F) could be transported through uninsulated pipe under certain circumstances. But it has to be pumped through fast. Further work is being carried on to determine the importance of other parameters.

Production of liquid helium was carried out at NBS in a laboratory-size system specifically designed for economy. Liquid nitrogen and hydrogen—already available in the lab—were used as precoolants, thus eliminating the need for moving parts and maintenance.

NBS has also applied the Venturi flow-meter to liquid-hydrogen applications. Studies showed that this inexpensive type of meter, commonly used at ordinary temperatures, is also quite accurate in gauging the flow rate of cryogenic liquids in the range of 9-270 gpm.

**Effect on Materials:** NBS also reported on the effect of low temperatures on 10 commercial adhesive combinations and on six magnesium alloys. Best of the adhesives tested were epoxy-phenolics, filled and supported on glass cloth. They showed the highest strength at low temperatures and had almost constant strength over the full range of test temperatures.

Results of the magnesium alloy studies show that they can withstand the low temperatures as well as other metals with good low-temperature properties, such as stainless steel, nickel and copper alloys.

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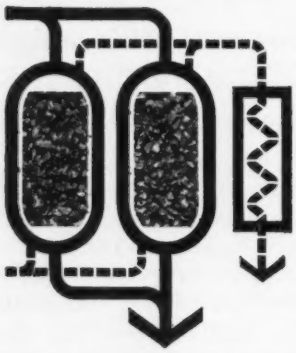

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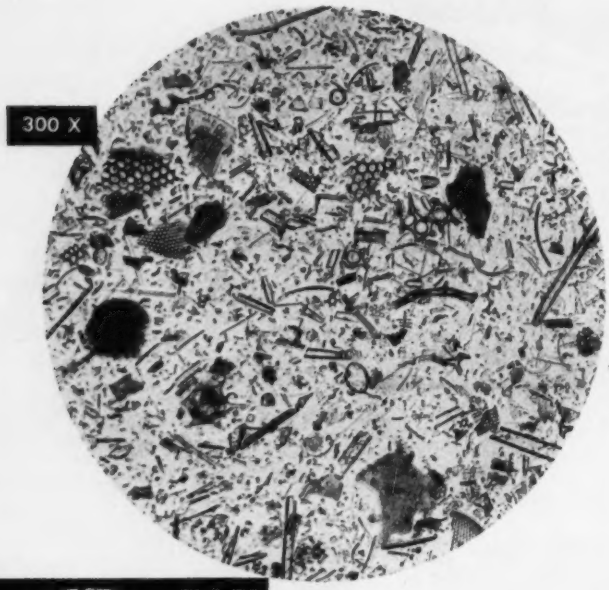


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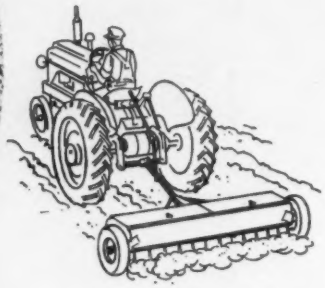

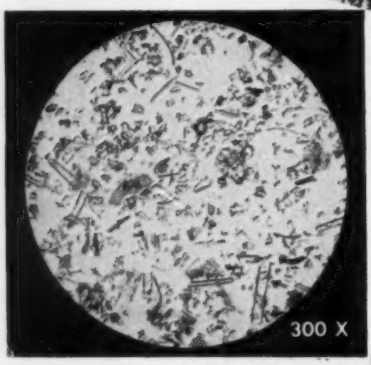


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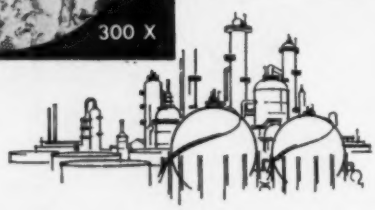

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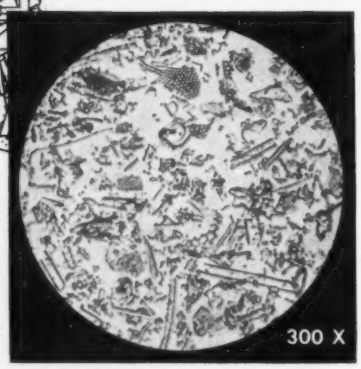


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# Technology
## Newsletter

**September 12, 1959**
**CHEMICAL WEEK**

**The controversy over 'hot' waste disposal is growing hotter.** Late last week, AEC granted the state of Texas permission to intervene in the commission's Oct. 13 hearings. At that time, AEC will review its decision to license Industrial Waste Disposal Corp. to dump low-level radioactive wastes into the Gulf (*see p. 89*). Briefs must be filed with AEC on or before Sept. 25.

•

**Chemical company research and development budgets are up** 11.3% this year over last, according to a new American Management Assn. (New York) survey. AMA surveyed close to 600 U.S. corporations in 23 industry groups, found R&D budgets up an average of 12%. The leader: automobile makers, with a 32% increase over last year. Chemical producers were third (4.3%), behind rubber fabricators (9.3%) and instrument makers (4.8%) in '58 R&D budget as percent of '58 sales.

•

**A liquid explosive, called Aerex, for metal-forming** has been developed by Aerojet-General (Azusa, Calif.). It is shipped as two relatively inert ingredients ("no more hazardous than kerosene," says Aerojet) that are combined to form a powerful, "nontemperamental" explosive—"it takes a blasting cap with a pretty good wallop to set it off." And it disperses and becomes harmless if spilled on the ground.

Aerojet says Aerex's chemical composition is proprietary information, does say its cost is comparable with other metal-forming explosives (*CW, Aug. 8, p. 75*). Anticipated "widespread" uses include cutting metal plate, slicing cable or pipe using a special V-shaped strip to hold the explosive.

•

**First user of the new J-57 jet engine-gas turbine system** developed by The Cooper-Bessemer Corp. and Pratt & Whitney (*see p. 55*) will be the Columbia-Gulf Transmission Co. (Houston, Tex.), a subsidiary of Columbia Gas System, Inc. Sy Orlofsky, C-G vice-president, says plans have now been filed with FPC. The turbine package will power a gas-transmission-station compressor at Clementsville, Ky.

•

**Underground atomic blasts may yield valuable isotopes,** such as fuel for batteries that "don't wear out." William Crane, chief of advanced development in isotopic power for Martin Co.'s (Baltimore) nuclear division, told the just-ended 17th International Congress of Pure and Applied Chemistry in Munich, Germany, that chief limitation on devices such as the isotopic battery SNAP-3 (System, Nuclear Auxiliary Power) (*CW Technology Newsletter, Jan. 24*) is the relative scarcity of suitable radioisotopes. Crane would convert plutonium-239, now in production, into plutonium-242 by irradiation. The latter, submitted to an underground A-blast, would yield "hundreds of grams" of curium-244, ideal for long-lived batteries.

# Technology

## Newsletter

(Continued)

**Phosphors are catching on in the automotive industry.** Much of the credit belongs to Sylvania Electric Products' Bayside, N.Y., labs, where research has led to a fivefold increase in phosphor-lamp brightness over the past two years. Dashboards of next year's Chryslers and Imperials will be illuminated by Sylvania's Panelescent lamps.

The dashboard lamps are being produced at the company's Chemical and Metallurgical Division (Towanda, Pa.). In the manufacturing technique, a thin steel sheet is first coated with a ground ceramic that forms a light background and prevents contamination of the phosphor. Then a zinc sulfide phosphor is mixed with a glass frit that is fired onto the metal. Final step: coating with tin chloride, which oxidizes to form a transparent, conductive layer. The finished panel is only 0.025-in. thick.

Sylvania is producing a 3-in.-diameter phosphor night light to sell for 98¢ (manufacturing costs would be about half that). The light plugs into a 110-v. outlet, is said to use about 3¢ worth of electricity in a year. In automobiles, a transistor oscillator excites the phosphors.

Sylvania is the only commercial producer of ceramic-phosphor coatings. The ceramic is said to prevent water-vapor penetration into the phosphor—a common occurrence that cuts brightness of plastic-phosphor combinations. Sylvania's ceramic-phosphor combinations are said to retain about 60% of their brightness after five years.

•

**Cross-licensing agreements on polycarbonate polymers** were concluded last week by General Electric and Farbenfabriken Bayer (Leverkusen, Germany). Each of the firms had independently developed similar polycarbonate production processes, and at about the same time. GE's Lexan is slated for a big production boost with the completion in mid-'60 of a multimillion-pounds-capacity plant near Mount Vernon, Ind. (*CW, June 6, p. 25*).

Polycarbonate patent holder Eastman Kodak (*CW, Sept. 7, '57, p. 41*) says it has no production plans at present, anticipates no conflict in any case, since its patents are primarily on composition of matter.

•

**Investigation of a possible automobile exhaust-cancer link** is being sponsored by General Motors. GM is making a $50,000 grant to the Sloan-Kettering Institute (New York). S-K will analyze tar samples collected from representative city atmospheres.

Meanwhile, the Air Pollution Foundation (San Marino) estimates that the prospective market for afterburners in California will be 7 million by Jan. '61.

•

**Electrical propulsion may replace chemical-fueled systems** in long-range space vehicles. Sidney Kash, manager of the ionic physics department of Lockheed Missile Systems Division (Palo Alto, Calif.), predicts that ionized-gas or plasma propulsion units, powered by solar- or nuclear-derived electricity, will provide greater payloads—in terms of the fuel.

# New "brain cells" for precision chlorination control

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CW PHOTOS—MARSHALL

**Consultant Roger Williams, fresh from European marketing meeting, evaluates Euromart market research.**

# Pegging Pitfalls in Foreign Market Research

**"Chemical market research** in Europe is a far cry from what we practice in the U.S. But if the recent meetings of European market research specialists, sponsored by the European Productivity Agency, did anything, they got market research, as we know it, off to a start." That's the report of Roger Williams (president of Roger Williams Technical and Economic Services), recently returned from the EPA sessions.

And there is good reason for believing that European market research may be ready to come of age. Members of the EPA — which is part of the Organization for European Economic Cooperation, sponsor of the recent Paris meetings — next month will recommend more emphasis on primary market research tools such as statistics, surveys by trade associations, standard nomenclature of commodities for all OEEC member nations.

The meeting dwelt primarily on consumer market research, despite attempts by several of the 10 U.S. delegates to turn attention to the very pressing problems of industrial market studies. "Just the same," Williams says, "I think the meetings generated real concern over the state of European industrial market research."

**'Common Market' Probe:** Growth of the European "Common Market" has spurred and will spur industrial growth tremendously. CPI firms with subsidiaries on European soil are look-

**'Big emphasis now is on standardizing statistical terms.'**

**'This is the type of thing OEEC can sponsor and get results on.'**

**'The Europeans place emphasis on the trade association role.'**

(Advertisement)

# Unusual dibasic acid spurs research in

- **polymers**
- **polyesters**
- **epoxy, alkyd resins**

Dimer acid, in constantly increasing production by Emery Industries, Inc., is one of the most intriguing materials to come out of the fatty acid field in quite some time. Already, dimer acid has inspired over 160 use patents in the realms of resins, polymers, polyesters and other chemical intermediates. And, according to industry experts, these achievements just barely scratch the surface of the potential represented by dimer's unique structure, surprisingly low cost and ready availability.

Empol 1022 is Emery's "standard" mixture of dimer and trimer acid, approximately 3 to 1 respectively. Other proportions are available on a development basis.

Dimer acid is a *liquid*—with a high molecular weight of 578 (36 carbon atoms) as compared to other common dibasic acids. As the name indicates, trimer acid is tribasic and has a molecular weight of approximately 850 (54 carbon atoms), yet it too is a liquid.

These unusual characteristics bring many interesting applications to mind. For example, in polyesters, epoxy finishes, urethanes, elastomers, foams, alkyds and related products, the ability of dibasic acids to form polymers is of prime importance. In combination with alcohols and polyols, dimer acid produces interesting esters that may find use as plasticizers and hydraulic fluid additives. And, because dimer acid will react much the same as monobasic acids such as oleic and stearic, dimer acid also enlarges the possibilities for unique soaps, metallic soaps and condensation products.

In addition to all this creative potential of Empol 1022, its tankcar price of 26c offers strong commercial inducements in comparison with other relatively expensive dibasic acids.

Emery Industries will gladly furnish samples on request. And, for additional information, you can write for the Emeryfacts titled "Empol 1022" and Technical Bulletin #412 containing abstracts of use patents. Write Emery Industries, Dept. I-9, Carew Tower, Cincinnati 2, Ohio.



ing for a sales increase of 14% in '59, 13% in '60. But European and U.S. companies must face up to some serious problems in learning the potential markets for specific products.

Take differences between countries. In the U.S., market researchers normally have to cope with only a limited number of distribution patterns, government regulations and transportation problems. In Europe, however, each country has its own procedure on taxes, regulations, distribution patterns and transport rules (*CW, Aug. 29, p. 67*).

But the need to check many information sources is only part of the problem, adds Williams. The poor quality of statistics is of equal or greater importance. Most compilations of basic statistics are often several years old and frequently use groupings and breakdowns rarely employed in the U.S. Moreover, European statistics may be far less specific than required.

The United Nations Commodity Trade Statistics quarterly and yearly reports, for example, are relatively current; they are issued about eight months after the time-period covered. These reports, however, use extremely broad product groupings.

Market research studies resulting from field interviews pose additional problems. Results are most conveniently tabulated in European terms, which are sometimes unfamiliar to American firms. And, says Williams, the problem of unguarded optimism in interpreting interview results is as great, if not greater, in Europe as in the U.S.

**Lack of Personnel:** But regardless of how a company attempts to carry out a market study overseas, it's likely to find knowledgeable European market probers hard to come by. The problem is aggravated by the natural reticence of many Europeans, particularly about business matters, and the lack of any organization similar to the Chemical Market Research Assn. Market researchers have a difficult time learning anything through informal conversations or "trade talk," says Williams.

He believes the most challenging aspect of European market research is in properly evaluating intelligence. "It's not difficult to sway a complete study merely by combining facts with different degrees of reliability. And even government information may sometimes present glaring errors, or gaps," he says.

Williams feels that most European market researchers look backward—at statistics and sales analyses—rather than forward — to projections of potentials and sales. He feels they are hampered by lack of better current trade information. Possible solution: a European equivalent of CMRA, which may be a few years off.

And he isn't alone in his estimations of foreign market researching. Elwyn Winne, vice-president of W. R. Grace's Polymer Chemicals Division, figures it takes about five times as much ingenuity to properly evaluate foreign market intelligence as it does U.S. information.

**What's Needed:** A highlight of the Paris meetings was a survey indicating the most-needed types of European market information.

Ranking high is information of a competitive nature. European market researchers, economists and statisticians are most interested in knowing the identity of competitors' particular businesses, their share of the market, their marketing structure and channels of distribution.

Other information deemed valuable includes advertising expenditures, production and sales figures, imports and exports. The specialists are also concerned with the proportion of total demand being satisfied in each member country.

**Plus Points:** One of the positive factors significant to CPI firms is that European customers are often few in number and clustered in or near major cities. Another: studies by European consulting firms have been known to cost as little as one-half as much as comparable studies done in the U.S. Reason: lower labor cost.

Moreover, thanks to rapid development of European industry and markets, market research is expected by many to more closely resemble U.S. methods. Result: more CPI firms that now find it difficult to probe specific European markets should be able to capitalize on prime market areas with the proper information to guide strategy and planning.

It may be several years before these effects are widely felt by CPI firms. But European market research is moving in the right direction to meet the mounting challenges of the European Common Market.

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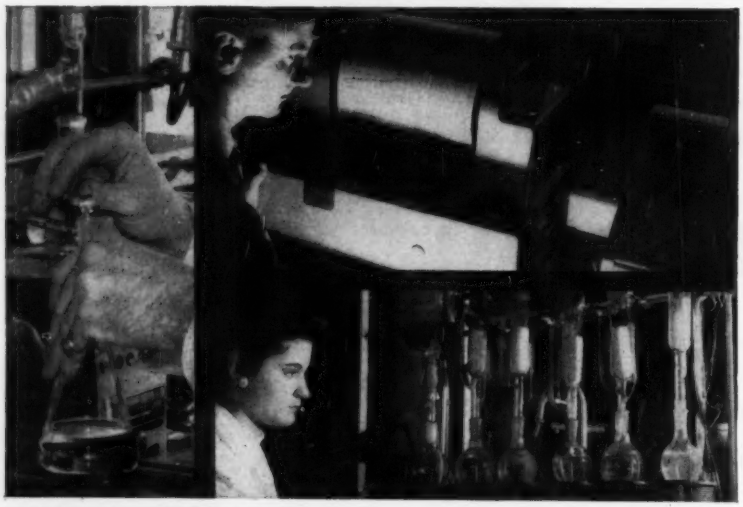

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SALES

## Tell the Office, Too

**Though trainers** of chemical salesmen have devoted much attention to salesmen's ability to communicate with customers, relatively less effort has been directed to the other side of the coin — the salesmen's need to communicate with home offices.

That's one of the reasons why the Salesmen's Assn. of the American Chemical Industry (SAACI) is planning to probe the subject at this year's annual sales clinic. Nearly half of the entire program will be devoted to communications when the clinic meets on Sept. 28 in New York City's Hotel Roosevelt.

In the morning session, Jesse Nirenberg, director of psychological services for TradeWays, Inc., will explain how to "get through to customers and the boss." Coleman Finkle, executive vice-president of Executive Communications, Inc., will tell what constitutes "good report writing." Rounding out the communications theme will be Eastman Chemical Products' Vice-President J. F. Magoffin, who will examine management responsibilities in feeding information to field staffers.

Emphasis in the luncheon and afternoon program will fall on the role that chemical salesmen will play in future years. The economic potential of the '60s will be forecast by J. Walter Thompson's vice-president and senior economist, Arno Johnson. Activities of chemical companies in developing managerial talent will be described by F. W. Steckmest, manager of Shell Oil's Employee Communications Dept.

And to wrap up the afternoon program, SAACI has slated a panel discussion on "The Changing Role of the Salesman—Yesterday, Today and Tomorrow."

## DATA DIGEST

• **Mineral Products:** Catalog lists company's line of mineral products, including pigments, clays, bauxites and limestone products. Minerals and Chemicals Corp (Menlo Park, N.J.).

• **Coal-Tar Chemicals:** New edition of company index of chemical products includes 12 new items. Reilly Tar & Chemical Corp. (Indianapolis).

• **Laboratory Chemicals:** Revised catalog lists over 4,500 organic chemicals, laboratory reagents, sol-

**MAGNESIUM OXIDE — A VERSATILE INORGANIC CHEMICAL.** Magnesium oxide is a necessary ingredient in the production of acetate rayon and insulating products. In sulphite pulping operations, it decreases stream pollution; it is a stabilizer in synthetic rubber manufacture and a filler in plastics. More and more high-purity magnesia refractories are being used in open hearth furnaces for increasing steel production capacity. Magnesia supplies the magnesium ion in animal feed supplements, and it is finding application as a fuel oil additive to reduce boiler scale. And there are many other uses for Michigan Chemical Corporation's chemically active magnesium oxide. Call on our technical consultants to help you with magnesia applications.

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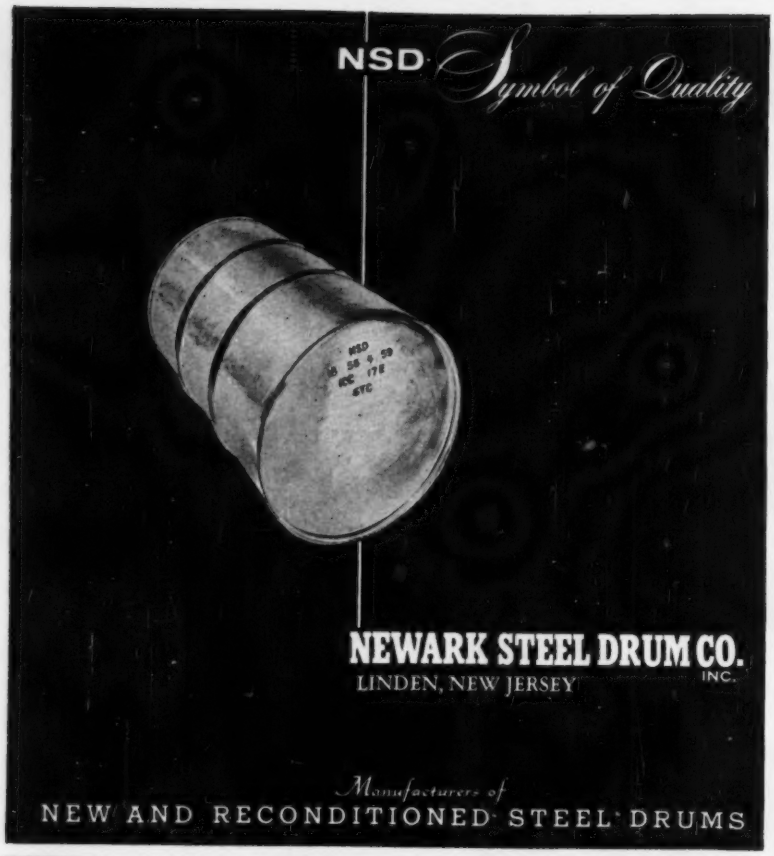


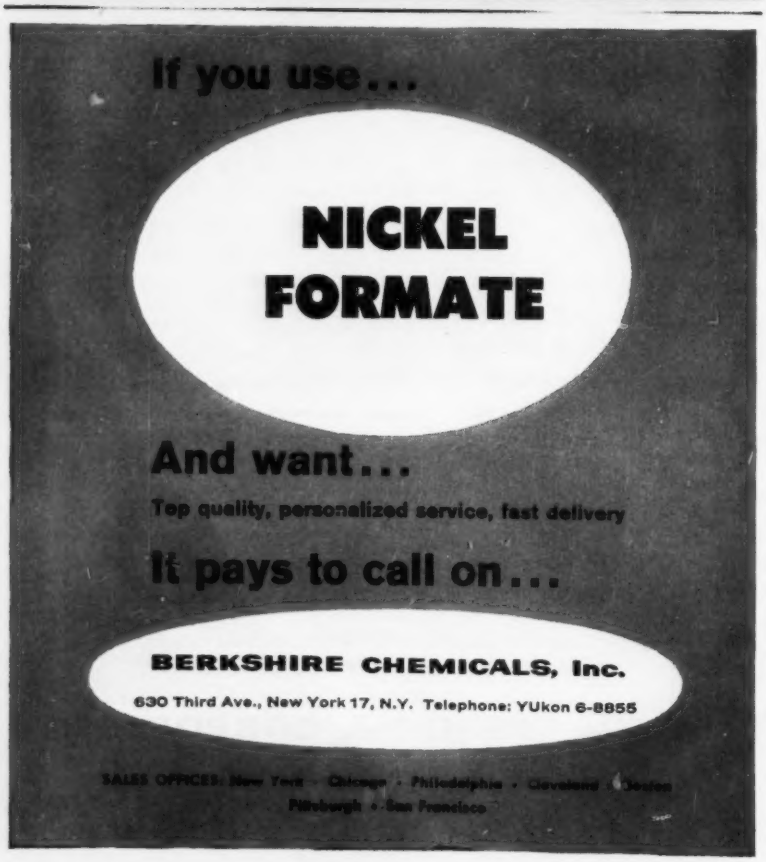
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## SALES

vents and biological stains. Matheson Coleman & Bell (2909 Highland Ave., Cincinnati 12, O.).

• **1,2-Butylene Oxide:** New six-page bulletin describes physical and chemical properties of 1,2-butylene oxide, suggests applications in stabilizers, solvents, petroleum additives, plasticizers, lubricants, textile specialties, and surface-active agents. Dow Chemical Co. (Milan, Mich.).

• **Coloring Agents:** Bulletin reviews color ranges available for company's Rigithane 112 foaming urethane resin, and suggests sources of supply. Thiokol Chemical Corp. (Trenton, N.J.).

• **Phthalate Esters:** Ditridecyl and didecyl phthalate are described in new, nine-page bulletin. Special emphasis is given to plasticizer applications for high-temperature vinyl insulation. Compatibility, exudation test and Underwriter's Laboratory test data are included. Chemicals Division, Enjay Co., Inc. (New York).

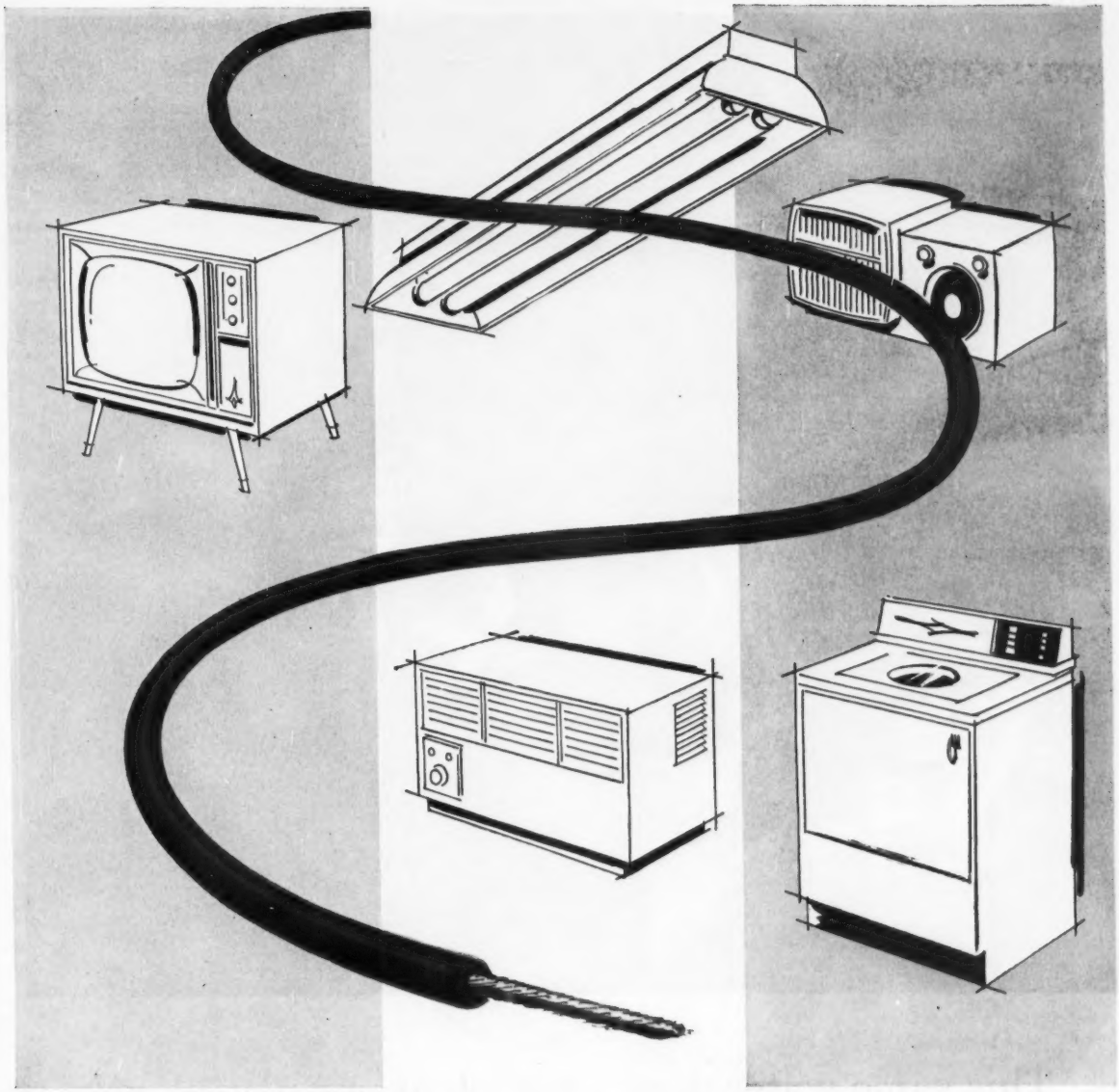
• **Trichloroethylene:** New 36-page brochure updates data on uses of trichloroethylene in vapor degreasing. Information includes sections on containers, handling, toxicity and safety and general physical properties. Hooker Chemical Corp. (Niagara Falls, N.Y.).

• **Agricultural Chemicals:** Catalog (40 pp.) tabulates and concisely describes company line of insecticides, rodenticides and antibiotics. Farm Chemical and Insecticide Division, S. B. Penick & Co. (New York).

• **Medical Chemicals:** New eight-page catalog lists 250 reagents used in medical research and biochemical analysis. Borden Chemical Co., Dajac Laboratories (P.O. Box 9522, Philadelphia 24).

• **Compressed Air:** Fundamental information on air compressors and industrial applications of compressed air are covered in 16-page illustrated brochure. Maintenance suggestions and tables showing compressor capacity necessary to operate various machines are also included. Ingersoll-Rand (11 Broadway, New York 4).

• **Vinyl Acetate:** Safety data sheet, SD-75 (30¢), records physical properties, outlines scope of potential hazards, gives basic safety and handling information such as fire-fighting procedures, labeling and first-aid suggestions. Manufacturing Chemists' Assn. (Washington, D.C.).



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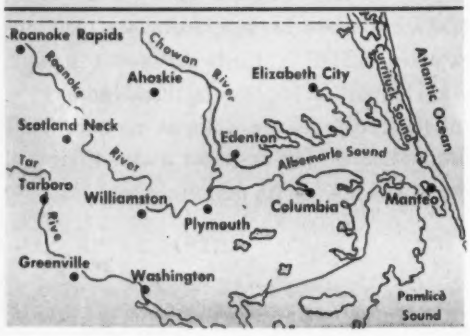


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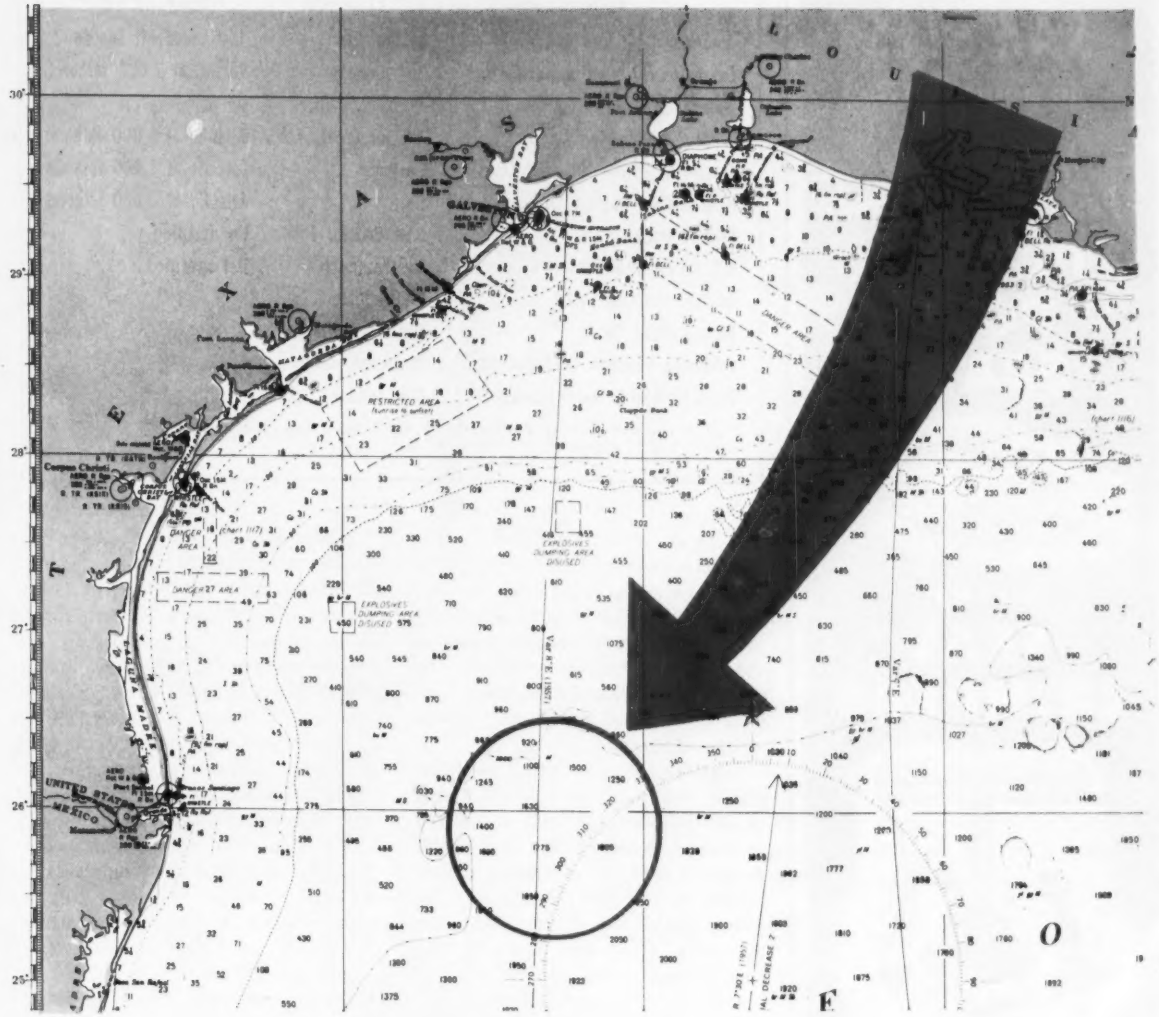
**Gulf site under fire—where Houston firm plans to dump A-wastes**




# At Issue: Watery Grave for 'Hot' Wastes

**About 180 miles south of Galveston, Tex., in the deep waters of the Gulf of Mexico, is located the focal point of a nationally significant, multisided clash over the potential hazards of low-level radioactive waste disposal.**

This mounting problem, affecting chemical process firms processing or using radiation materials, comes to a head next month in an Atomic Energy Commission hearing that may resolve future disposal policies.

Pollution experts from chemical process companies, civic groups, and local, state and federal governments will be closely following the hearing. A number of interests are at stake: the survival of private firms collecting low-level atomic wastes—e.g., Houston's Industrial Waste Disposal Corp.; the relationship between state and federal authorities in disposal control; future expenses and problems inherent in disposal of nuclear wastes by the more than 1,500 industrial radioisotope users and others who contribute to the nation's atomic "garbage pile."

**Focus on Houston:** Symbolic center point of the clash over low-level A-waste disposal is Industrial Waste Disposal Corp.—promulgator of remote dumping in the Gulf. The hearing next month is to determine whether the firm should be granted a license to collect low-level, packaged radioactive wastes from licensed users of radioisotopes and be able to dispose of them at the Gulf site in 1,000 fathoms (6,000 ft.) of water.

After a public hearing in January, an AEC examiner directed that a license be issued to the firm. However, exceptions to the decision were filed by Harris and Nueces counties' authorities and the Sportsmen's Club of Texas, resulting in an AEC decision to postpone issuance until further review. Oral arguments will be heard

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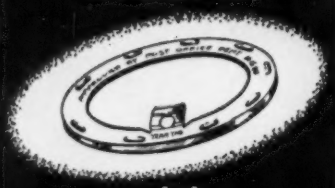

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| Company | Location | Dumping Site* |
|---|---|---|
| American Mail Line Ltd. | Seattle | 150 miles off Seattle |
| Coastwise Marine Disposal Corp. | Los Angeles | Pacific at 2,000 fathoms |
| Isotopes Specialties Co. | Burbank, Calif. | No dumping yet |
| Nuclear Engineering Co. | Walnut Creek, Calif. | Atlantic at 1,000 fathoms |
| Crossroads Marine Disposal Corp. | Boston | Atlantic at 1,000 fathoms |
| New England Tank Cleaning Co. | Boston | Atlantic at 1,000 fathoms |
| Walker Trucking Co. | New Britain, Conn. | No dumping yet |
| U.S. Radiological Defense Laboratory** | San Francisco | Not specified |
| Atlantic Refining Co.** | Philadelphia | " |
| Socony Mobil Oil Co.** | Paulsboro, N.J. | " |
| California Research Laboratory** | Richmond, Calif. | " |
| Naval Medical Research Laboratory** | New London, Conn. | " |

* Total disposals to date: 2,400 curies in the Atlantic, 102 curies in Pacific.
** Licensed to dispose of own wastes at sea.

Oct. 13 at Germantown, Md.

**Public Clamor:** Disposal of radioactive wastes is not a new problem for AEC. But the problem is growing in proportion to public awareness of the potential hazards involved. The result of increased awareness has been cries for Congressional action, stricter controls.

High-level wastes—stored in underground vaults ashore—are not a part of this problem. Concern is centered on the less-dangerous, low-level wastes produced by 4,400 radioisotope users (double the number five years ago) and dispersed into rivers or buried in the ocean, up to now at 1,000 fathoms. Adding to this concern:

- A recent suggestion by a committee of the National Academy of Sciences (NAS) that wastes might safely be dumped in the ocean in depths as shallow as 54 ft. and as close as 19 miles offshore.
- An AEC committee recommendation for approval of 28 offshore sites listed by NAS as suitable for waste-disposal dumps—one as close as 19 miles off Texas' Sabine Pass, in the Gulf in 42 ft.
- A U. S. Dept. of Health, Education and Welfare (H-E-W) report showing that more than half of the 28 uranium ore-processing plants now in operation are dumping waste products into Western rivers. Radioactive concentrations in excess of maximum currently permissible levels have been found in most of the rivers checked.

**Some Activity:** Public concern already has brought about action. H-E-W expects next year to begin studies of three more Western rivers suspected of being polluted by A-wastes—the Big Horn, Sweetwater and North Platte. And H-E-W Secretary Arthur Flemming has asked U.S. Surgeon General LeRoy Burney to determine the cost of a study of all streams known to be contaminated with radioactive wastes.

Meanwhile, Flemming has announced that the first federal enforcement action is about to end contamination of the Animas River in Colorado and New Mexico where 30,000 people have been exposed to higher-than-allowable levels of radioactivity. In a voluntary action, Vanadium Corp. of America has agreed to use all of the known methods to reduce the radium content of the wastes it discharges into the river at Durango, Colo.

The National Academy of Sciences has proposed a 10-year, $30-million study of oceanography, which would acquire much-needed knowledge of subsurface ocean currents and the eventual distribution of matter dumped into the sea.

In another report, an NAS committee has proposed that a systematic monitoring program be started to determine the consequences of radioactive discharges from atomic ships. From this, charts could be drawn up to show ship captains where radio-

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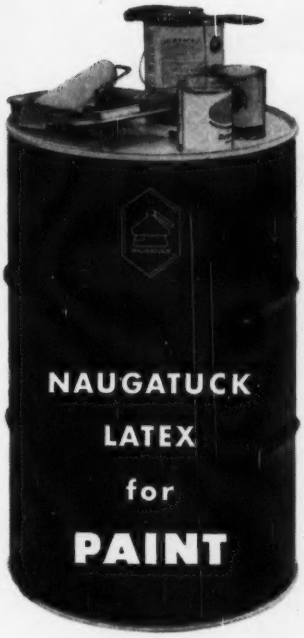


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NAUGATUCK CHEMICAL DIVISION

active wastes might be safely dumped.

The U.S. Public Health Service this month will begin a study of the effect of atomic wastes on marine life. The study will be conducted at two disposal sites off the New England coast. Later studies, according to Flemming, will be carried out in the Gulf of Mexico in cooperation with AEC and the Dept. of Commerce's Coast and Geodetic Survey.

And, President Eisenhower, by executive order, has established a federal radiation council, with Flemming as chairman. Purpose: to set permissible levels of radiation exposure, provide centralized control of general policies on radiation. PHS will remain responsible for research and collection and interpretation of radiation data, and AEC will continue its present research activities in this area.

More recently, however, the Congressional Joint Committee on Atomic Energy approved a bill that would establish a nine-man federal radiation council, including the Eisenhower council, plus several scientists. This council would supersede Flemming's group, perform the same functions.

**Congressional Confusion:** U.S. congressmen looking into the problem of A-waste disposal admittedly are confused by the raft of reports and proposals from government and private agencies.

Rep. Bob Casey of Houston pinpoints part of the confusion by citing two apparently conflicting NAS reports. One report recommends 28 ocean and Gulf sites as suitable for dumping low-level wastes. Another, by the academy's committee on oceanography, advises that no one should select sites for dumping radioactive material until "one [is] able to predict factors which control their distribution." The report adds that present knowledge of the factors "is far too fragmentary to permit precise prediction" of submarine distribution.

Also under criticism by some congressmen is the comment by Industrial Waste Corp.'s President Donald Hood, professor of chemical oceanography at Texas A & M College. Hood says his firm, if licensed by AEC, would expect to take advantage of recommended areas in disposing of wastes. This would mean that the firm might dump as close as 21 miles off the Gulf coast.

Congressional investigation of the waste disposal firm's plan has resulted in considerable opposition from scientists, public health officials, state and local government units and sportsmen's clubs. And it has turned the spotlight on existing A-waste disposal firms (*see table, p. 90*). Texas' entire bloc of congressmen opposes granting a license to Hood.

A concrete upshot of Congressional opposition was legislation introduced by Rep. Clark Thompson of Galveston, backed by congressmen from Alaska, California, Connecticut, Massachusetts, North Carolina, Rhode Island and Virginia. Their bill would prohibit radioactive dumping in less than 1,000 fathoms and within 200 miles of the coast. It also would give the states veto power over AEC in matters of control and regulation of low-level dumping.

The CPI stake in radioactive waste disposal is big. Not only is it an important facet of the complex problem of pollution; it's also a problem that ultimately will affect the cost of doing business of any concern that has to dispose of radioactive "garbage."

## Speaking Out on Taxes

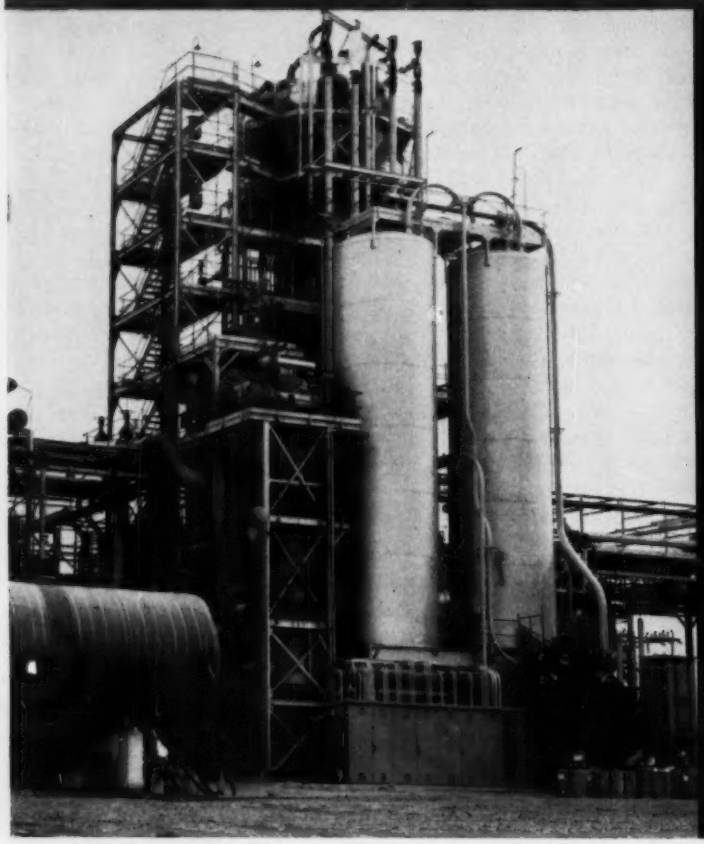
**Not only are taxes rising steadily, but so is the cost of determining and remitting them. That's the import of a new survey by the National Industrial Conference Board. Moreover, a couple of chemical process management firms are vocal and specific in complaining about the problem.**

NICB's study, compiled last week, is based on reactions of 222 manufacturing companies, among them 49 chemical process firms, to a questionnaire. The companies—citing the volume increase in tax returns, assessments, tax bills, protests and correspondence—responded that the cost of complying with federal, state and local tax regulations is high and can be expected to go higher. One conclusion: the vastly different requirements of the multifarious taxing authorities is a big factor in heightening the cost.

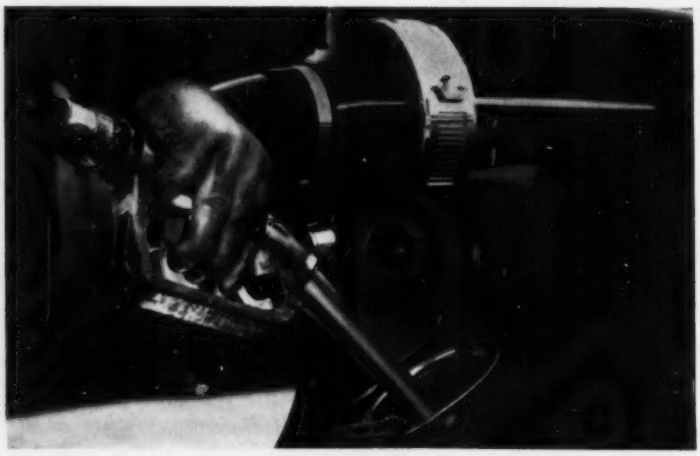
**Vocal Complaints:** And traditionally reticent process management is speaking up specifically about tax matters. In a letter to legislators in Michigan, which has been bordering on bankruptcy, Wyandotte Chemical President Robert Semple pointed out that "local assessment practice seems

CYANAMID

# Chemical Newsfront



**NEW PROCESS IMPROVES PURITY OF PHTHALIC ANHYDRIDE.** Over ten years of Cyanamid research and development results in an improved method of manufacturing phthalic anhydride. In operation at Cyanamid's Bridgeville, Pennsylvania plant, the new process involves catalytic oxidation of naphthalene in fluid bed converters—results in greater purity. Similar improvements currently in progress will expand Cyanamid's maleic anhydride capacity at Bridgeville from 14 million pounds annually to 20 million pounds. These developments will enable Cyanamid to meet the increasing needs of the many users of both phthalic and maleic anhydride. (Plastics and Resins Division)



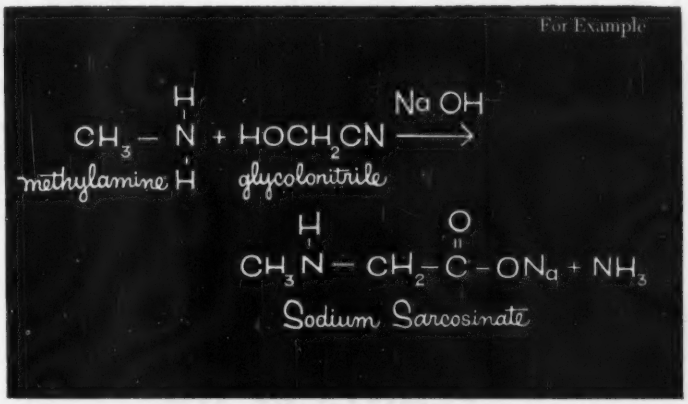
**DYE-DUSTING PROBLEMS END FOR GASOLINE REFINERS** using Cyanamid's CALCOGAS ROCKET RED. Superior to powdered oil reds, this new red dye eliminates dusting problems in storage and handling. Non-dusting, non-caking and extremely soluble, its granulated form facilitates use in automatic metering and mixing equipment. Because of its non-caking properties, Calcogas Rocket Red resists physical change even at the high temperatures often found in refinery storage areas. In addition to the new Rocket Red Calcogas, Cyanamid also manufactures and sells other exceptionally soluble, dustless colors to the petroleum industry such as Calcogas Orange NC and Calcogas Yellow NC. (Dyes Department)



ADMINISTRATION

**NEW PAPER INSULATION UPS PEAK TRANSFORMER LOADS 20%.** Cyanamid's ACRYLONITRILE has helped General Electric develop a new paper for the insulation system of its pole-type distribution transformers. Paper manufacturer Hollingsworth & Vose produces the new insulating paper from kraft pulp chemically treated with acrylonitrile. In a process known as cyanoethylation, acrylonitrile is added to the pulp to modify its chemical structure and greatly strengthen heat-resistance and retention of dielectric and tensile strength properties. Pulp treated with acrylonitrile also results in substantially improved dimensional stability – important for applications such as map paper and business machine punch cards. **(Petrochemicals Department)**

**TEXTILES STAY CLEANER . . . WON'T CLING** when treated with Cyanamid's CATANAC® *SN Anti-static Agent*. A small amount of Catanac SN in relation to the weight of the material is usually sufficient for complete control of annoying static electricity. Catanac SN is effective on all fibers, including the synthetics. Application may be made by brush, pad, or spray and, on washable items, by addition to the rinse water. Catanac SN has proved a boon to many industries as well as to the consumer. When used in textile coning oils, for example, it is beneficial in keeping the lubricated material static-free during processing. **(Market Development Department)**




**A BETTER WAY TO MAKE α-AMINO ACIDS.** The availability of Cyanamid's AERO Glycolonitrile has made possible the use of an easier and better method for producing α-amino acids. This process is based on the condensation of glycolonitrile with ammonia or amines, followed by hydrolysis of the resulting aminonitrile. By combining hydrogen cyanide with formaldehyde to form glycolonitrile, Cyanamid has greatly reduced the hazards and difficulties encountered in using free hydrogen cyanide. The glycolonitrile route to α-amino acids can result in economic advantages. **(Process Chemicals Department)**

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## ADMINISTRATION

to vary between counties. It would seem that industries are taxed at higher rates in those counties that have the greater concentration of industries."

Semple estimated that his company has to pay twice as much in state and local taxes as the average paid by its competitors in other states. The result, he said, is a 20% loss in profits after federal taxes.

Another process firm speaking up about tax inequities is Dow Chemical. In a talk to Texas businessmen, Texas Division General Manager A. P. Beutel commented that while the population of Texas over the past 20 years has increased about 45%, the total tax bill, not including federal taxes, has climbed more than 400%. In Brazoria County alone, he said, population has grown 182% but taxes are up 850%. He pointed out that in the past 15 years, Dow's production in Texas has increased 650%, but its total tax bill has gone up 1,450%.

**Costs Surveyed:** NICB learned in its survey that among 127 firms that permitted analysis of their tax preparation costs, 46 found that 1958 costs amounted to 1-2% of their total tax; another 40 put the cost at 3% or more. Understandably, cost is relatively greater for small firms than for large.

Most companies participating in the NICB survey felt that much could be done to relieve the pressure of tax costs by institution of uniform tax regulations among the various authorities. They desire uniformity in definitions, allocations and in forms. Most, however, are not hopeful of early improvement.

## LABOR

**Climax Contract:** At American Metal Climax's Carteret, N.J., smelter and refinery, employees of Local 837, Mine, Mill & Smelter Workers, voted to ratify terms of a new two-year contract. It calls for a general wage increase of 7¢/hour retroactive to July 1, and a further 7¢ increase July 1, '60. The contract calls for substitution of a noncontributory pension plan in lieu of the contributory plan previously used.

•

**Phosphate Settlement:** International Minerals & Chemical Corp. and Local

613, International Chemical Workers, have signed a three-year contract covering the company's Bonnie, Fla., plant.

The new agreement calls for an average wage increase of 10¢/hour, and automatic increases of 5¢/hour during the second and third years of the contract period. Other changes include an additional holiday, improved vacation plan.

•

**Metals Agreement:** At Marietta, O., Union Carbide Metals Co. and 1,200 members of Oil, Chemical & Atomic Workers, in wage-reopening negotiations, agreed to a 10¢/hour across-the-board increase on a contract due to expire Aug. 28.

But at Portland, Ore., a Metals Co. ferroalloy plant was shut down when 100 members of the United Steelworkers went out on strike at the end of a three-year contract and after they had rejected a company offer to extend the expiring contract.

## KEY CHANGES

**Arthur M. Golden,** to president, Cellofilm Industries, Inc. (Woodbridge, N.J.).

**James P. Coughlin** to vice-president —sales, **Roland Reppert** to vice-president — marketing, American Hard Rubber Co., division of Amerace Corp. (New York).

**Homer C. Wilson** to vice-president, Texas Butadiene & Chemical Corp. (Houston).

**William H. Brockman** to director and vice-president of purchases, Century Chemical Corp. (New York).

**Howard Phipps, Jr.,** to director and member of the executive committee, Western Petrochemical Corp. (New York).

**Werner Klugman** to director of manufacturing, Paints and Finishes Group; **David Laub** to vice-president, Contracting Division, A. C. Horn Corp., subsidiary; Sun Chemical Corp. (New York).

## DIED

**Everett Keith McMahon,** 39, manager, Chemical Sales Division, Tennessee Products & Chemical Corp. (Nashville, Tenn.).

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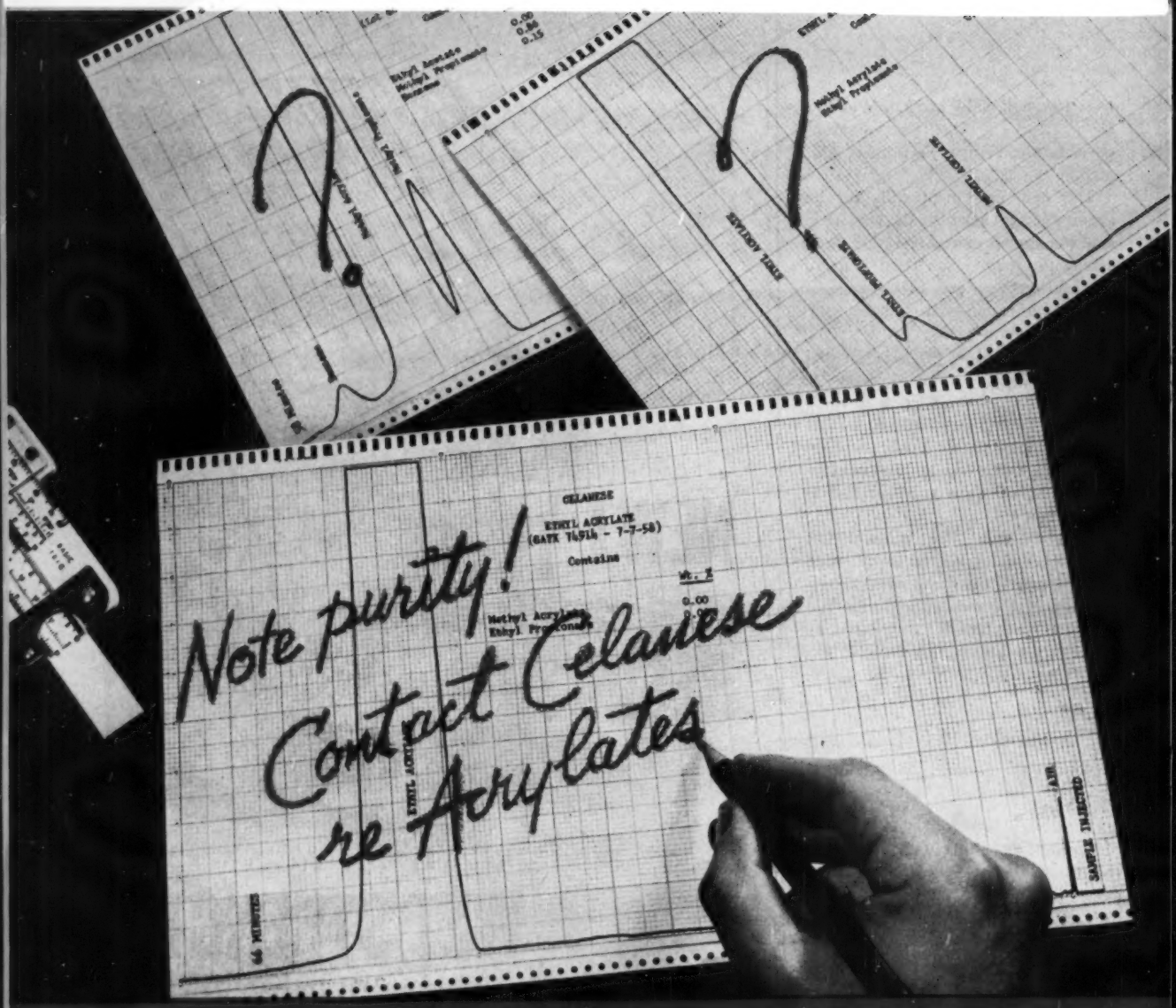


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# Market Newsletter

CHEMICAL WEEK
September 12, 1959

**First test batches of magnesium have been produced** at Alabama Metallurgical's new Selma, Ala., plant, where two of 10 furnaces have been activated. Alamet (jointly owned by Calumet and Hecla of Chicago and Brooks & Perkins of Detroit) plans full production before '60. Initial capacity is reportedly about 7,000 tons/year—considerably smaller than the 92,000 tons/year capability of Dow Chemical, only other commercial magnesium producer. (Small amounts of magnesium are also made at a government-owned plant at Canaan, Conn.; and recycled metal is turned out by Titanium Metals at Henderson, Nev.)

**Alamet will apparently be swinging into the magnesium business** at a good time. Although national magnesium output during the first half of '59 fell to 12,781 tons—33% lower than in the same period of '58—shipments in '59 increased 42%, to 22,770 tons. Heavy inventories that hampered the U.S. magnesium business last year may be whittled down to more comfortable proportions by '60.

**Meanwhile, giving the magnesium business a helping hand,** the Bureau of Mines is developing and testing new and improved magnesium-base alloys, and is laying groundwork for improvement of production techniques.

•

**Six U.S. lead and zinc smelters have teamed up in opposition** to current U.S. quotas on imports of these metals. Their strong "recommendations": quotas should be rescinded and replaced by increases in appropriate customs duties.

The joint statement to the U.S. Dept. of Commerce—pleading financial hardships—was presented by these firms, which together represent about 50% of U.S. lead and zinc smelting and refining capacity. They are: American Smelting & Refining, American Zinc, Lead & Smelting, Athletic Mining and Smelting, Blackwell Zinc, Matthiessen & Hegeler Zinc and National Zinc.

Their basic argument: prolonging the quota system will jeopardize continuation of a competitive domestic custom-smelting industry, through "artificial" reduction of raw materials. Specifically, the firms want elimination of quotas on unmanufactured lead and zinc; also they want increased duties, but with "compensatory duty treatment for a minimum number of selected lead and zinc products" so that domestic fabricators won't be placed in unfair competitive position.

•

**U.S. helium production rate has been upped 65%** by completion of a $10-million recovery plant at the Keyes natural gas field near Boise City, Okla. The installation has a capacity of 300 million cu.ft./year (it can process 50 million cu.ft./day of natural gas), was built for the U.S. Bureau of Mines by Fluor Corp. Ltd.

Although the government now has five helium plants, USBM officials express fear that a supply pinch will develop after '60—despite the expected startup of Helex Co.'s privately owned, 260-million-cu.ft./-year unit at Sunray, Tex. (*CW, April 25, p. 86*).

•

**Unloading of 500,000 tons of stockpiled high-grade natural** rubber by the U.S. may come next March; but the plan apparently isn't causing much worry among producers of synthetic rubber. One reason: the government's assurance that disposition will be made gradually to avoid disruption of normal markets.

Moreover, consumption of natural and synthetic rubbers is moving at a brisk pace, and some observers foresee a $6-billion rubber sales level this year; the healthy situation results from sales-pacing production increases while inventories remain lower than in '58.

Natural rubber consumption in the U.S. amounted to 239,726 long tons in the first six months of '59, significantly more than the 195,253 tons used in the same period of '58. Meanwhile, consumption of synthetic rubber jumped more than twice as much, from 373,136 long tons in first-half '58, to 466,096 tons in the same period of '59.

•

**U.S. primary aluminum production is moving at a lively pace.** Output hit an all-time high of 179,194 short tons in July and totaled 1.12 million tons in the first seven months of '59—881,102 tons were turned out in the same period of '58. The second quarter of '59 was also a record-breaker: 486,393 tons of primary aluminum were produced.

Fast step-ups of aluminum sheet, plate and foil shipments are spurring the production increases. According to latest reports from The Aluminum Assn., total sheet and plate shipments in the first seven months amounted to well over 958 million lbs., while foil shipments totaled about 144 million lbs. The continuing market strengthening is pointed up by the big July shipment of steel and plate, 173 million lbs., compared with 135 million lbs. shipped in April. Foil shipments reached a monthly high of 24.8 million lbs. in July.

**SELECTED PRICE CHANGES—WEEK ENDING SEPTEMBER 7, 1959**

| | Change | New Price |
|---|---|---|
| **UP** | | |
| Coconut oil, crude, tanks, Pac. Coast | $0.00625 | $0.16875 |
| Aarabic gum, amber, 10 bgs. | 0.015 | 0.295 |
| Peanut oil, refd., tanks | 0.0025 | 0.1525 |
| Corn oil, crude, tanks | 0.00125 | 0.11875 |
| **DOWN** | | |
| Palm oil, clarif., tanks | $0.002 | 0.11875 |

**All prices per pound unless quantity is quoted.**

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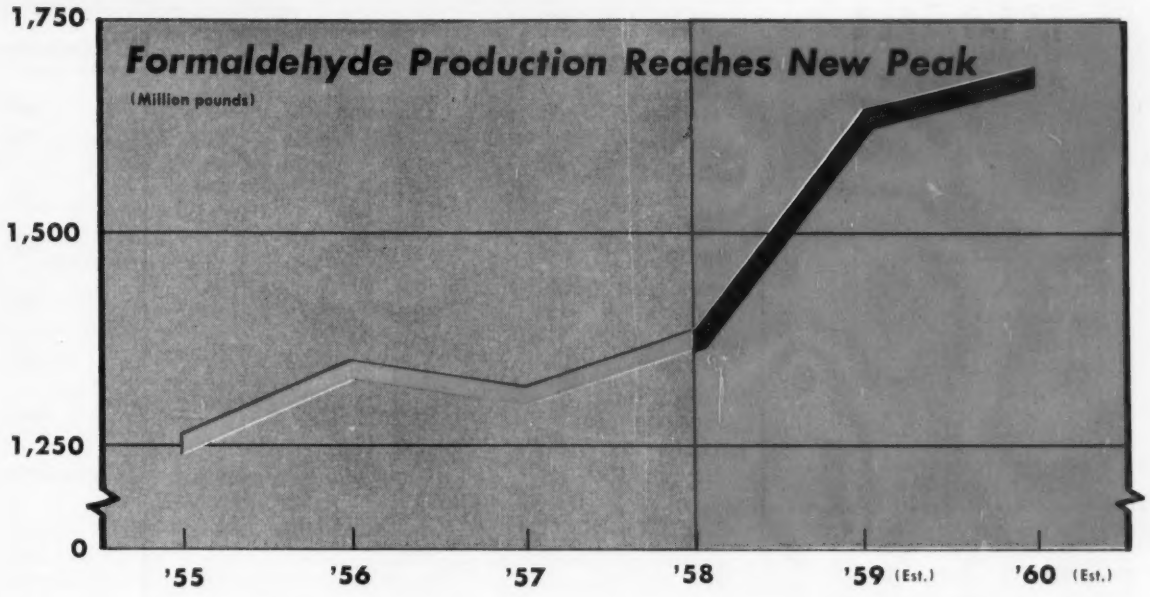


# Plastics—Foundation for Formalin Growth

**The giant U.S. formaldehyde industry is showing renewed life this year. Production is surging at a rate over 34% higher than in any previous year; producers, spurred by increasing demands, are already planning new capacity boosts.**

In the first six months of '59, U.S. production of formaldehyde amounted to 850 million lbs., 34.3% higher than output in the comparable period of recession-year '58. And, while output in July and August tapered off from the record monthly production thus far racked up, it's still expected to be higher than in the slack corresponding months of '58—perhaps even reach new high points for this period.

A more significant comparison: formaldehyde production in first-half '59 was 24% higher than the record half-year production of 685 million lbs. in '56.

Prospects during the rest of '59 remain bright. Formaldehyde production not only is expected to remain close to its present high rate but also may get a boost from a new consuming industry. Du Pont's new Delrin formaldehyde resin is now moving into commercial production at an estimated initial rate of about 1 million lbs./month.

These two factors—high demand and expanding uses—should boost formaldehyde production, during all of '59, into the 1.6-1.65-billion-lbs. range—if the steel strike ends. Consumption of formaldehyde in '60 and '61 is expected to continue to grow at least 3-4%/year; it's very probable that Du Pont's new Delrin will nudge this growth rate somewhat higher during this period—perhaps to 5-6%.

Pacing the production upturn is a tremendous demand for phenolic, urea and melamine resins. These products account for about 50% of all the formaldehyde consumed. Meanwhile, manufacture of pentaerythritol—another large outlet for formaldehyde—has also been on the upswing (*CW, Aug. 29, p. 117*).

Big production gains being made by urea-melamine types of resins translate into substantially increased formaldehyde demands. In the first half of '59, 200.6 million lbs. of urea and melamine resins were consumed in the U.S.—32.5% more than in first-half '58, 19% more than in the same period of '56—the industry's record year. On a monthly basis, too, urea-melamine resins continue to set records, exceeding 30 million lbs.—and hitting a record 37.4 million lbs. in June '59.

Mainly responsible for the growth of these resins is the plywood industry. The 60 million lbs. of urea and melamine resins consumed by this industry in the first six months of '59 is 71% over the '58 figure and exceeds the '56 record by 13%. Resins for laminates also showed significant gains during this period.

Phenolics are also having a heyday. Although the increased use is not equal to that of the urea-melamines, the growth is substantial. Over 285.4 million lbs. of phenolic and other tar-acid resins were produced during the first half of '59, which is 36.5% greater than the '58 output, and 5.7% above '56's record 270-million-lbs. output. And, on a monthly basis, these resins are also reaching new highs. In March, a record 50.6 million lbs. of resin were turned out, while May and June production exceeded 49 and 48 million lbs., respectively.

Plywood has also been the major growth area for phenolic resins. During the first six months of '59, resins for plywood use totaled about 28.8 million lbs. This is 22.5% higher than that produced in '58 and '57. Another end-use that is showing renewed strength is molding powders. Although the 109 million lbs. of resin going

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## Formaldehyde Capacity Moves South and West

| Company | City | Capacity (million pounds) |
|---|---|---|
| **Alabama** | | |
| Borden | Demopolis | 40 |
| Reichhold | Tuscaloosa | 30 |
| **California** | | |
| Commercial Solvents | Agnew | 30 |
| **Illinois** | | |
| Spencer | Calumet City | 48 |
| **Kansas** | | |
| Reichhold | Kansas City | 30 |
| **Louisiana** | | |
| Commercial Solvents | Sterlington | 30 |
| **Massachusetts** | | |
| Monsanto | Springfield | 160 |
| **Missouri** | | |
| Hercules | Louisiana | 100 |
| **New Jersey** | | |
| Du Pont | Perth Amboy | 150 |
| Heyden Newport | Fords | 60 |
| Heyden Newport | Garfield | 175 |
| Union Carbide | Bound Brook | 150 |
| **New York** | | |
| Borden | Bainbridge | 36 |
| Hooker | North Tonawanda | 90 |
| Kay-Fries | West Haverstraw | 18 |
| **North Carolina** | | |
| Borden | Fayetteville | 40 |
| Reichhold | Charlotte | 10 |
| **Ohio** | | |
| Allied | Southpoint | 200 |
| Du Pont | Toledo | 73 |
| **Oregon** | | |
| Borden | Springfield | 36 |
| **Pennsylvania** | | |
| Trojan Powder | Seiple | 40 |
| Merck | Danville | 400* |
| Rohm & Haas | Bristol | 25 |
| Rohm & Haas | Bridesburg | 25 |
| **South Carolina** | | |
| Reichhold | Hampton | 30 |
| **Texas** | | |
| Celanese | Bishop | 300 |
| **Washington** | | |
| Borden | Seattle | 36 |
| Reichhold | Seattle and Tacoma | 50† |
| **West Virginia** | | |
| Du Pont | Belle | 300‡ |

* Company utilizes only about 100 million lbs. of capacity for production purposes.
† Plant being transferred to Tacoma.
‡ Major part of capacity is integrated into ethylene glycol operations, with only a small part of production taken off as formaldehyde.

**Formaldehyde Uses**

| | 1958 |
|---|---|
| Phenolic resins | 24.0% |
| Urea resins | 20.0 |
| Melamine resins | 5.5 |
| Adhesives | 7.5 |
| Hexamethylene-tetramine | 9.5 |
| Pentaerythritol | 15.0 |
| Exports | 1.0 |
| Others | 17.5 |
| Total | 100% |

Source: CW estimates.

into this category during the first half of '59 is not a record, it is second only to the 120.5 million lbs. turned out in '56.

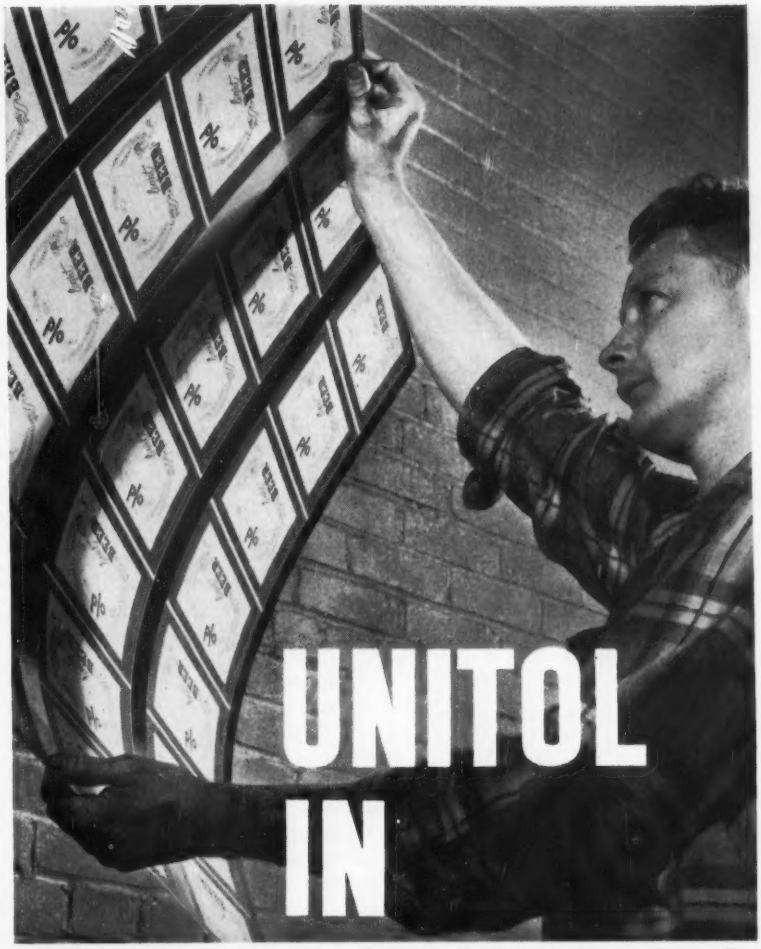
Pentaerythritol, third-largest formaldehyde consuming industry, has also shown renewed growth, and is moving at a production rate comparable to that of '55—the industry's record year.

Although the first half of '59 has shown record outputs of formaldehyde and its major end-uses, the actual upturn got under way during the last half of '58. Even during this period formaldehyde output was at a record of 757 million lbs., reflecting the better times being enjoyed by its consuming end-use industries.

**Formaldehyde Paradox:** One facet of the formaldehyde picture that poses a question is the paradox of continued production growth, during the past few years, while production of the upgraded formaldehyde products were showing little change — i.e., phenolics had modest growth; urea-melamine resins and pentaerythritol were dropping off.

From '55 through '58, formaldehyde output increased 141 millions lbs. This growth was in contrast with the growth of major consuming industries. And, during '58, production of formaldehyde rebounded by 65 million lbs., from a '57 slump year, to a new high. At the same time, phenolics, urea-melamine resins and pentaerythritol all took sharp drops.

Possible explanation may lie in two areas: (1) captive outlets for urea-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## MARKETS

formaldehyde resins, (2) agricultural use of urea-formaldehyde fertilizers.

Urea-formaldehyde resins for use in textiles and paper are now being manufactured by many firms, in these industries, for their own captive use. Thus, these resins would not have to be reported to the government. Actually, the government figures for urea-melamine resins in both textile treating and for the paper industry fail to reflect the large growth that producers now claim for these outlets. For instance, production figures for these resins in textile treating were higher in the first half of '55 through '57, than they were in the first part of '59. And, production of resins for the paper industry in the first half of '59 (15 million lbs.), was only 1.5 million lbs. higher than for the same '57 period.

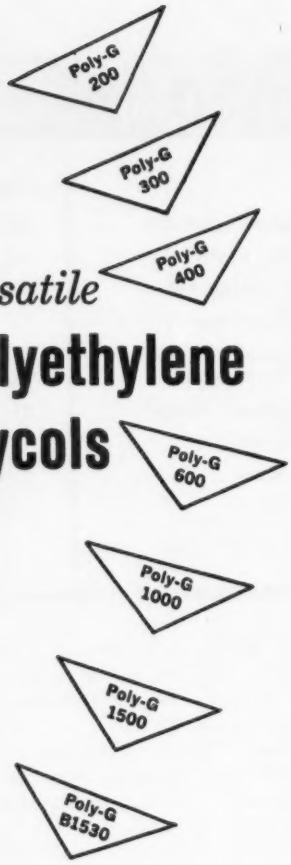
In the agricultural field the use of urea-formaldehyde may be more widespread than is now generally recognized. (Formaldehyde is used to control the release of nitrogen into the soil.) Although this material has not been widely used by commercial farmers, because of its high price, it has found a sizable outlet in the home garden market. Thus, this is another area where no reliable statistics are available, although trade observers report it to be another growing field for formaldehyde consumption.

These two applications seem to explain some of the reasons for the phantom disappearance of formaldehyde, although exact pinpointing of the discrepancy is not possible.

Du Pont's captive use of formaldehyde at Belle, W. Va., is not included in the Dept. of Commerce formaldehyde production statistics.

Reichhold's position in the formaldehyde picture is being slightly altered this year. First the company lost its Ballardvale, Mass., plant early this year because of fire. And, since the lease is about to expire at its Seattle, Wash., plant site, operations will be transferred to the company's plant at Tacoma.

Encouraged by the increased activity in formaldehyde, producers are already looking for new marketing areas for their product. Among trade sources there's continuing talk of expansions, and chances are that several will make news in the next few months.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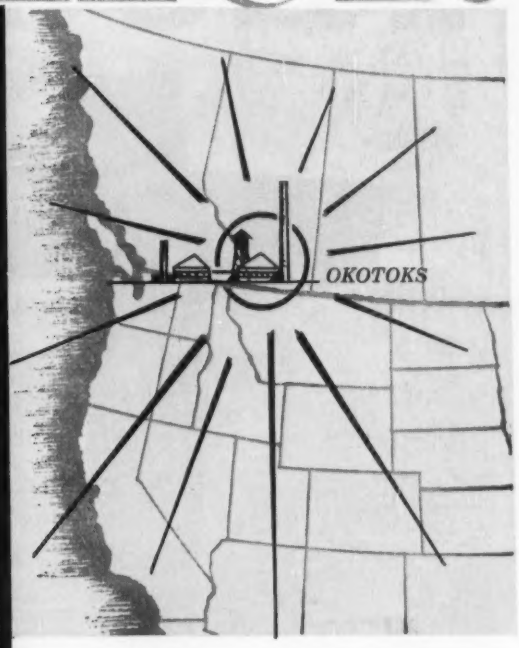
*Spotlighting the new TGS Recovery Plant at OKOTOKS*



OKOTOKS marks another step in the steadily broadening service being developed by TGS for industries in the States and Canada. Production from OKOTOKS, sitting on top of the vast "sour gas" field a few miles south of Calgary, Alberta, will add a significant tonnage to the supplies of Sulphur already available through TGS to the expanding industries in the Pacific Northwest. OKOTOKS is set up to make shipments of Sulphur in solid or molten form.

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| benzoquinone | → | quinhydrone |
| sulfuric acid | → | hydroquinonemono(or di)sulfonic acid |
| halogens | → | halogenated hydroquinones |
| ethyl acetoacetate | → | 4-methyl-6-hydroxycoumarin |
| carbon dioxide | alkaline conditions → | gentisic acid |

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# Germans Lower Boom on Ag Chem Makers

**U. S. citrus growers—and suppliers of agricultural chemicals—are anxiously speculating about the ramifications of a recently adopted West German food additives law. The new measure, to become effective Dec. 23, is an attempt by the German Federal Republic to replace a number of different state regulations by a uniform federal statute. It will directly affect citrus imports—and may well restrict use of pesticides and colorants on fruit to be sent to Germany.**

In setting up the new law, the Germans grafted onto the existing laws regulations that closely resemble Section 408 of the Miller Amendment on pesticide chemicals and Section 409 of the food additives amendment of the U.S. Federal Food, Drug and Cosmetic Act. The result is a very strict law — likely to be enforced with German thoroughness.

Moreover, the German lead in citrus import regulations may be followed by other countries. If so, the European market for U. S. citrus fruits will be greatly diminished—and it's a sizable annual market, estimated to be around 100 million cases, worth about $3.50 each.

**Broad Effects:** Though all pesticide residues will come under German surveillance, it's felt that the major concern of the new law will be with post-harvest pesticides and chemicals — fungicides, coloring agents and waxes. Donald Rubel, director of the Fruit and Vegetable Division of U. S. Dept. of Agriculture's Foreign Agricultural Service, told *CW* that while the U. S. Embassy in Bonn reports that the Germans are trying to come up with "reasonable" regulations, it looks as if the new rules may ban fruit coloring completely. This could be serious; when Canada banned food colors on citrus fruits several years ago, shipments from this country dropped 65%.

Prohibiting the use of additives will affect exporters in other orange-growing nations besides the U.S., such as Israel and Argentina as well as their chemical suppliers. Shippers in those countries claim that pesticides are not used on fruit, a claim that U. S. fruit producers don't believe, and will try to disprove. Even if these countries could show they do not use pesticides, they would still suffer from the German laws. Israelis, for instance, are big users of biphenyl, a decay inhibitor, and Argentineans use Red No. 2 on some of their oranges that don't tree-ripen.

**New German law restricts U.S. export chemicals used on fruit.**

**Call for Committee:** So far, citrus growers — not pesticide or colorant makers — have taken action against the new law. In the U. S., they have set up a cooperative called the Industry Committee on Citrus Additives, headed by A. G. Solter, chairman of Sunkist Growers, Inc.

He told *CW* that the specific objectives of the group are (1) to cooperate fully with the U. S. Food & Drug Administration; (2) to cooperate with the West German Food & Drug Act and to obtain clearance for all chemicals used on citrus fruits under the new German law; (3) to obtain clearance under other food laws that are written or may be written in the near future in other countries.

The committee's technical director, Lloyd Hazelton, president of Hazelton Laboratories (Falls Church, Va.), is now in Germany. He's helping the West Germans set up a laboratory for measuring chemical residues on imported citrus fruit. F. A. Gunther, insect toxicologist, University of California Citrus Experiment Station, and Leonard Rygg, of the USDA Agricultural Marketing Service (Pomona,

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Calif.), are also in Germany cooperating on this project.

Currently in Germany, too, are Karl Loos, Washington attorney for the citrus growers, and Marvin Walker, manager of the Florida Citrus Canners Co-op, as well as the Florida Citrus Commission's J. R. Groves, chairman, and Homer Hooks, manager.

**Chemical Companies Cool?** A number of petroleum, paper, farm machinery and other firms have offered active support to the citrus committee in dealing with the German law. What has baffled and angered some citrus growers has been what they term "luke-warm" support of their fight by the chemical companies.

Some growers say chemical companies "have not taken one step" to aid their fruit-growing customers. Others express a more moderate view. Said one highly placed member of the committee: "I don't want to say that the chemical companies are not cooperative. They're just conservative, don't want to jump until they know which direction they ought to jump. And I don't blame them. I'm hopeful we'll be able to get together."

Another member felt that because of the extreme expense U. S. firms faced in clearing their chemicals with federal and state agencies in the U.S. they are reluctant to start the whole procedure all over again.

**Passive Retaliation:** To get an industry-wide slant on the problem, *CW* checked with Lee Hitchner, executive secretary of the National Agricultural Chemicals Assn. He said NACA is doing virtually nothing about the problem. The group is concerned, of course, only with pesticides, not other additives. And since most of the pesticides used in this country are also used in Germany, he's confident they will not be ruled out under the food additives law. The association is leaving it up to individual companies that have interests abroad to protect their own products.

Asked if there had been any criticism from the citrus growers about NACA's lack of participation, Hitchner said he "wasn't aware of any."

**Hearn to be Heard:** Sure to be a key figure in future dealing with Germany and other European countries is Martin Hearn, director of the International Trade Division of Florida Citrus Mutual (Lakeland, Fla.). He's hoping to duplicate in Europe the sort of success that has been attributed to him in Canada. When the color Red No. 2 was considered ready for widespread use last spring, Hearn took data from toxicological and other tests here in the U. S. and presented them to the Canadians. The Canadians gave approval on Aug. 12 for use of Red No. 2. Now U. S. citrus growers are talking of trebling the present yearly shipping rate to Canada of 258,000 standard boxes of citrus fruit.

Hearn will take to the British, Germans, Belgians and Netherlanders the same evidence he presented to the Canadians. The Netherlands — possibly as a result of the Canadian acceptance of Red No. 2 — last week extended their cutoff of fruit treated with Red No. 2 to Sept. 1, '60.

Belgium and the Netherlands markets are especially important to the U. S., since a large portion of the oranges consumed in Germany pass through these two countries. A health ban by either could conceivably affect German consumption even if the Germans relaxed their own restriction.

**Fair Weather Friends?** The German situation poses a good opportunity, according to many citrus growers, for the chemical companies to speak up. A good start has been made toward getting industry-wide interest focused on the problem. Now the citrus growers are looking for the chemical makers to show a little interest, too.

## Commence Dispensing

**Makers of automatic washing machines are bringing out their '60 models this month, and, although all the new machines haven't yet been shown, it's already evident that one big trend today is the move to automatic dispensing of detergents and laundry aids.**

Here's a rundown of which laundry specialties are automatically dispensed:

**Everything Automatic:** Probably the most elaborate injection system is that in Norge's Model AW-562 Dispensomat. Its dispenser automatically adds powdered or liquid detergents, water conditioners, dry or liquid bleaches. These are released from containers that flip out of the machine's panel face. Frigidaire distributes detergents and laundry aids from two cups atop the agitator posts

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**Bleach:** Philco's Model 704 Duomatic dispenser automatically injects either liquid bleach or rinse conditioner. General Electric's Filter Flo Model 1050T dispenser holds 3 qts. of liquid bleach—enough for a month's washings.

**Rinse Additive:** Several companies have shown models with rinse additive dispensers, including Westinghouse, on its Model L1000 washer; Kelvinator, on its Style Mark Line Model KW 92M as an optional feature; RCA Whirlpool and Easy Washing Machine Co., on several of their models.

## PRODUCTS

**Throwaway Toothbrush:** A disposable toothbrush (for one-time use) has been introduced by Flex-I-Brush Corp. (Lodi, N.J.). It's molded in one piece of Celanese Corp.'s Fortiflex linear polyethylene. Cost will run about 3½¢ each to volume buyers, according to the company.

•

**Resin Emulsion:** Shawinigan Resins Corp. (Springfield, Mass.) is now producing a borax-stable polyvinyl acetate-dibutyl maleate copolymer emulsion, designated Resin D-243. It's said to have good compatibility with organic solvents, is suggested for use in adhesives, textile finishing and paper coatings.

•

**Bleach Tablets:** The White King Soap Co. (Los Angeles) has brought out a new household bleach product called Bleach Tabs. A package of 12 tablets, individually wrapped in plastic envelopes, is priced at 49¢.

•

**Cationic Softener:** Crest Chemical Corp. (225 Emmet St., Newark, N.J.) is offering Catacrest 100, a 100%-active substantive cationic softener. It's substantive in long bath and is used in quantities of approximately ¼ to ½% on the weight of fabric.

•

**Nylon-Neoprene Adhesive:** Reevestrip Adhesive, for bonding oriented nylon strip to neoprene, is now being marketed by Reeves Brothers, Inc.

(1071 Avenue of the Americas, New York). It's also suitable for bonding nylon strip to nylon strip.

•

**Aluminized Asphalt Coating:** Flintkote Co. (New York) has developed an asphalt emulsion coating compound containing aluminum. Called Aluminized Static, it is said to hold its brilliance and reflectance for five years. The product is furnished in 55-gal. drums and 5-gal. cans. Price: around $3.75/gal.

•

**Latex for Paper Coatings:** Dylex Latex KCD-154, a new coating for paper, has been developed by the Plastics Division of Koppers Co. (Pittsburgh, Pa.) for pigmented paper coating. It is claimed to have up to 50% more film strength than conventional styrene-butadiene latexes, is also said to produce less foam than conventional latexes.

•

**Exterior Latex:** Glidden Co. (Cleveland, O.) is now offering a latex-base house paint, Spred House Paint. An acrylic material, it is intended for application on wood, masonry, stucco, cement, metal, and on asbestos and asphalt shingles. The new paint retails for $7.98/gal. The company is also offering two primers as companion products: Primecoat No. 1 for new or unpainted wood, and Primecoat No. 2 for previously painted surfaces.

•

**Synthetic Grease:** A synthetic grease, Anderol L-237, has been developed by Lehigh Chemical Co. (Chestertown, Md.) for valve applications. It resists mechanical breakdown over a temperature range from —20 to 300 F. It's available in 1- and 5-lb. cans, and in drums up to 400 lbs.

•

**Oven Cleaner:** Vapor Brite, an oven cleaner, has been introduced by Copper Brite, Inc. (Los Angeles, Calif.). An open can of the product is placed in an oven for 20 minutes; the oven may then be wiped clean. A 21-oz. can of the product sells for 79¢.

•

**Free-Piston Lube:** Esso Research and Engineering Co. (Linden, N.J.) has developed a lubricant called Tro-Mar FP-50 for free-piston engines. It is said to allow free-piston engines to operate without interruption for


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|---|---|---|---|
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| | | 115 | 34.0 |
| | | 130 | 6.4 |

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## SPECIALTIES

periods considerably longer than 1,000 hours.

•

**Caulking Compound:** A one-part caulking compound, Maintz, is now being offered by West Chester Chemical (Box 39, West Chester, Pa). It is available in 12 colors and is sold in 1-gal. (price: $14.90) and 5-gal. ($14.35/gal.) containers.

•

**Neutral Cleaner:** T. F. Washburn Co. (2244 Elston Ave., Chicago) is offering a concentrated liquid, Turgene, which forms neutral cleaning solution when diluted with water (dilutions of 8-100 parts water to 1 part concentrate). Turgene will be sold under private labels.

•

**Orange-Brown Dye:** An orange-brown dye has been added to Canadian Industries Ltd.'s (P.O. Box 10, Montreal, Que.) Procion line of ICI dyestuffs. It's known as Procion Orange Brown, HG.

•

**Dust-Repellent Plastics:** Latest entries of Union Carbide Plastics Co. (New York) are two dust-repellent polyethylene formulations, designated DNDA-0401 and DPD-7366. Both are designed for the molded-housewares industry, feature low-temperature toughness, improved rigidity.

•

**Latex Resin:** A latex resin compatible with zinc oxide (for paint formulations) has been introduced by National Starch and Chemical Corp. (New York). The compound is a polyvinyl-acrylic copolymer, is called Resyn 25-2243.

•

**Squeeze Bottle Auto Polish:** Associated Engineering Chemistry, Inc. (P.O. Box 1777, Fort Lauderdale, Fla.), is now marketing a liquid auto polish, called 3-D. It's packaged in a 22-oz. polyethylene squeeze container. Price: $2.50. The company is also selling a 3-D White-wall Tire Cleaner for $1.25, also in a squeeze can.

•

**Cosmetics Gel:** B. F. Goodrich (Cleveland) has a new version of its Carbopol water-soluble resin. The new material, called Carbopol 940, is said to form extremely clear gels, is suggested in formulations for hair-grooming preparations, foundation creams, moisturizers, after-shave products and sun-screening lotions.

# Tracers

**TO THE CHEMICAL PROCESS INDUSTRIES**

*Published: each Saturday—closes 11 days in advance.*

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### POSITIONS VACANT

***Plant Manager—Rapidly growing heavy chemi***cal manufacturer in New Jersey needs a qualified man to manage one of its Sulfuric Acid plants. Experience in sludge acid burning process is mandatory. Broader responsibilities will develop rapidly with our program of planned growth. Replies will be held in strict confidence. P-2361, Chemical Week.

***Market Research And Development. Vacancy*** exists for organic chemist, preferably Ph. D. with some experience in either of above activities. New England location. Interviews can be arranged at ACS meeting. P-2508, Chemical Week.

***Desperately need a chemist experienced in*** formulating Automobile polishes, wax, etc. Company established. Chance of a lifetime partnership proposition offered. P-2557, Chemical Week.

***Pharmaceutical Research and Development*** Group Leader. Ph.D. in Pharmacy or Pharmaceutical Chemistry to lead group developing ethical pharmaceutical products. Two to five years of industrial experience preferred. Excellent opportunity with rapidly expanding Ames Company, subsidiary of Miles Laboratories, Inc. Send complete résumé including salary requirements to: Personnel Department, Miles Laboratories, Inc., 1127 Myrtle Street, Elkhart, Ind.

### SELLING OPPORTUNITIES AVAILABLE

***Manufacturer's Representative wanted to handle*** line of liquid agitators with unique features in Chicago area. Give details of organization including personnel, lines now handled and area covered. RW-2481, Chemical Week.

***Salesman wanted—industrial chemicals. The two*** Carolinas and Virginia. SW-2343, Chemical Wk

***If you are a manufacturer seeking new or*** added sales outlets—or if you are a manufacturer's agent or chemicals distributor with the capacity, time and energy to take on additional lines—make your interests known in this column of Chemical Week. The right agent or jobber teamed up with the saleswise manufacturer makes the right combination for the hard selling days ahead. There's profit for both, which can be initiated through low-cost classified advertising. Write Employment Opportunities, Chemical Week. P.O. Box 12, New York 36, N.Y.

### POSITIONS WANTED

***Successful Industrial Finishes Sales Manager*** interested in joining industrial finishes company or division in top level capacity. Seeking company or division not keeping pace with sales progress in to-day's expanding market. Personnel and facilities to keep abreast of sales potential and growth must exist or be provided. PW-2472, Chemical Week.

***34 year old Canadian graduate chemist seeks*** employment offering a challenge. Conscience work. Willing to accept responsibility. 12 years experience at all levels of responsibility in household bleach and its related application in laundries, water treatment; specialties; industrial chemicals etc. Interested in Technical Sales and/or Service. Apply PW-2560, Chemical Week.

### CONTRACT WORK WANTED

***Custom Grinding-Ultra Fine or Course-Specialty*** or Volume Blending and Grinding service on unit or contract basis. Complete CO2 installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. entral Avenue, Box 682 Oak Lawn, Illinois.

### SELLING OPPORTUNITY WANTED

***Manufacturers Representative, Michigan, north***ern Ohio, commission sales organization wants to sell chemical and plastic raw materials. All replies confidential and promptly answered. Wire or write: Box 3703 Detroit 15, Mich.

### MANAGEMENT SERVICES

***Clark Microanalytical Laboratory—CH. N. S.*** Halogen, Fluorine, Oxygen, Alkoxyl, Alkimide, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill., EMpire 7-8406.

***Wisser And Cox—Engineers-Geologists. Min***eral raw materials from exploration to marketing. 55 New Montgomery-San Francisco, California. YUkon 2-1436. Cables: GEOLOG.

### CONTRACT WORK WANTED

***Air Milling—extremely fine particle size in the*** low micron range. Can handle heat sensitive materials. Experienced personnel-lab control. Storage and drop shipments arranged. Excellent transportation for domestic or export. Central Chemical Corporation, Processing Department, Box 310, Hagerstown, Maryland. REgent 3-4700.

### BUSINESS OPPORTUNITIES

***A British chemical engineering and contracting*** company is now free to consider the further application of U. S. processes and specialist equipment in the chemical industry. Old established, highest reputation, ample financial resources. Design, research, technical service and sales facilities are available. Also space for pilot plant work. Manufacture can be arranged in Britain and, if necessary, in continental Europe for the Euromarket. Please write in first instance, giving brief details, to BO-2572, Chemical Week.

***Available for acquisition. Los Angeles Chemical*** processing plant. Established corporation operating profitably with limited capital. Retention of competent management optional. Audited reports available. Will consider merger. Reply to BO-2569, Chemical Week.

### CHEMICALS WANTED

***Surplus Wanted—Chemicals, Pharmaceuticals,*** Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

### WANTED

***Bakelite BR-9432 Resin (Phenol-Formaldehyde)*** $.33/lb. (Orig. Bbls.). Carbon Tetrachloride-Redist. & Restabilized $.075/lb. (Bulk). DOA, Virgin, Off Color 10 drums $.35/lb. Barium Hydrox. N. F., (J. T. Baker Orig.) 15 Leverpaks $.06/lb. DBM, Virgin, Off Color 30 drums $.15/lb. (Bulk). Lacquer Thinner, Off Color $.25/gal. (Bulk). ±10 Dr. Triethylene Glycol Dicaprylate $.18. Dr. Carbowax 200 (orig.) carbide. 1 Dr. Carbowax 1500 (orig.) carbide. 1 Dr. Kromfax Solvent (orig.) carbide. FS-2577, Chemical Week.

### FOR SALE

***$3,000,000 Liquidation-Chemical Plant at*** Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers. Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

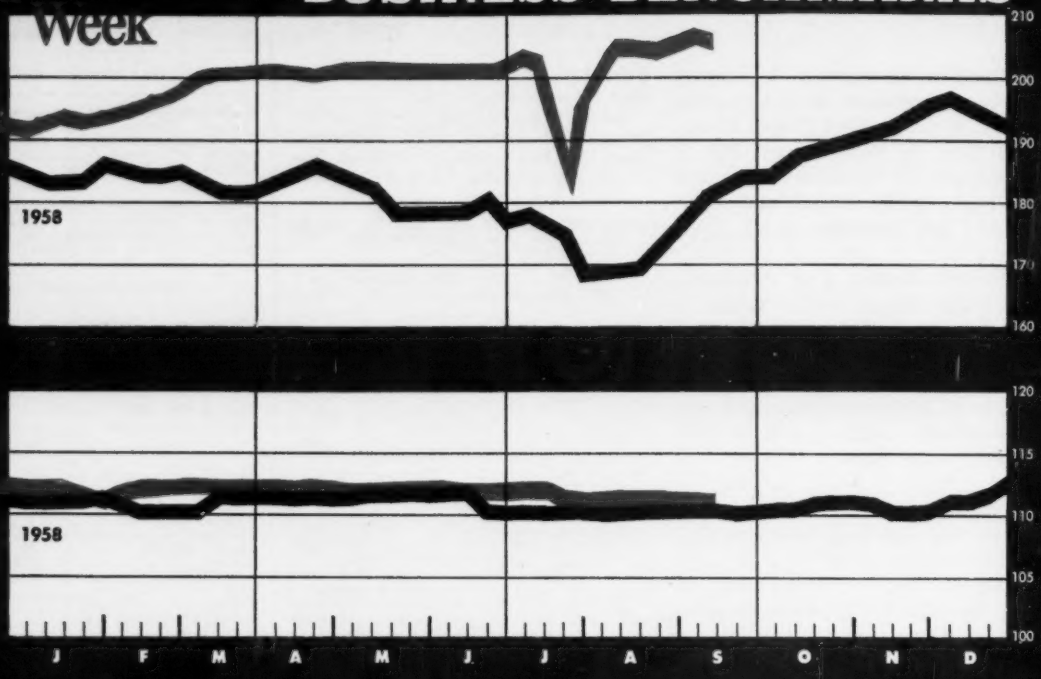
***Surplus and dead inventory wanted. We pay top*** dollar for unwanted chemicals and chemical products, waxes, spent catalysts, metal sludges, wasted solvents and gas cylinders. Industrial By-Products & Surplus Co., 40-40 Lawrence Street, Flushing 54, New York, INdependence 1-4100.

***90% Methanol—20,000 gallons—20 cents/gal***lon. Suitable for anti-freeze. FS-2437, Chemical Week.

***1—1400 gal. T304 St. St. Jacketed Kettle,*** 5/2.2 HP XP agitator. Very nice condition. Perry, 1415 N. Sixth St., Phila. 22, Penna.

***For Sale: Unused Buflovak Single Drum Vacuum*** Dryer, 5' dia. x 12' long, in whse., never installed. Cost new over $40,000. Will Sacrifice at $15,000. FOB. FS-2533, Chemical Week.

# BUSINESS BENCHMARKS




**SEPTEMBER 12, 1959**

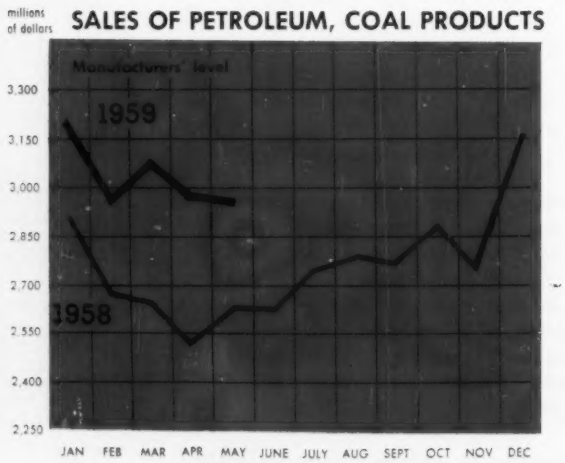
## WEEKLY BUSINESS INDICATORS

| | *Latest Week* | *Preceding Week* | *Year Ago* |
|---|---|---|---|
| Chemical Week output index (1947-1949=100) | 208.5 | 207.3 | 181.0 |
| Chemical Week wholesale price index (1947=100) | 110.8 | 110.7 | 110.7 |
| Stock price index (12 firms, Standard & Poor's) | 59.24 | 59.73 | 44.73 |
| Steel ingot output (thousand tons) | 345 | 332 | 1,666 |
| Electric power (million kilowatt-hours) | 14,109 | 14,003 | 12,272 |
| Crude oil and condensate (daily av., thousand bbls.) | 6,821 | 6,817 | 6,863 |

## FOREIGN TRADE INDICATORS

| | *EXPORTS* | | | *IMPORTS* | | |
|---|---|---|---|---|---|---|
| | *Latest Month* | *Preceding Month* | *Year Ago* | *Latest Month* | *Preceding Month* | *Year Ago* |
| Chemicals, total | $121.2 | $130.1 | $113.3 | $29.2 | $28.5 | $20.3 |
| Coal-tar products | 9.2 | 7.5 | 6.8 | 6.9 | 5.0 | 4.5 |
| Industrial chemicals | 20.6 | 23.6 | 16.7 | 10.3 | 9.8 | 7.2 |
| Medicinals and pharmaceuticals | 21.6 | 25.3 | 24.4 | 1.7 | 1.8 | 1.2 |
| Fertilizers and materials | 8.2 | 8.8 | 11.2 | 7.6 | 9.3 | 5.6 |
| Vegetable oils and fat (inedible) | 3.0 | 12.9 | 3.1 | 7.0 | 8.7 | 5.8 |

## CHEMICAL CUSTOMERS CLOSE-UP



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- **Reinforcing agent** - rubber, silicone, latex film
- **Anticaking agent** - sulfur, insecticides
- **Antislip agent** - solvent-base floor waxes
- **Precoating material** - reproduction paper
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( ) Cab-o-sil in the Rubber Industry (#crub-1)
( ) Cab-o-sil in Butyl Rubber (#crub-2)
( ) Cab-o-sil in Dipped Latex Films (#crub-3)
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( ) Cab-o-sil in the Plastics Industry (#cpla-2)
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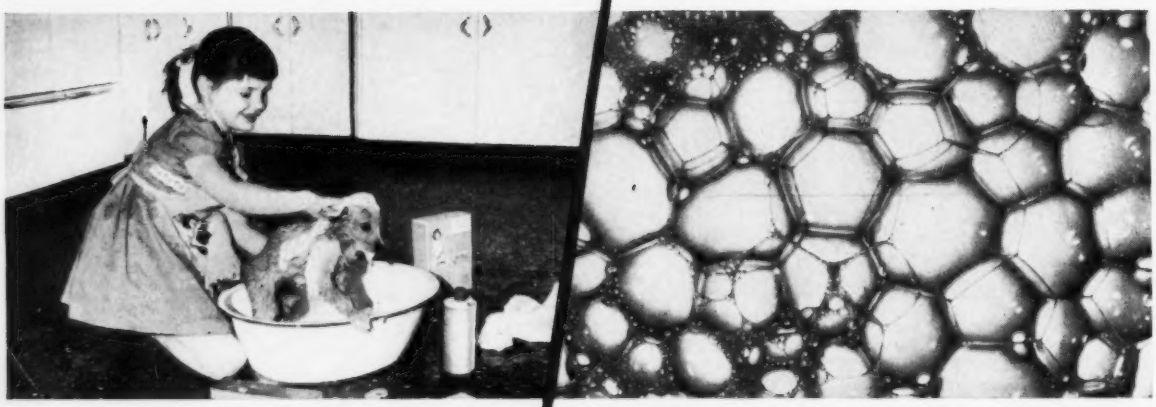

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